

FLIGHT

The
AIRCRAFT
ENGINEER
&
AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport
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INDEX AND TITLE PAGE FOR VOL. XII.

The 8-page Index for Vol. XII of "FLIGHT" (January to December, 1920) is now ready, and can be obtained from the Publishers, 36, Great Queen Street, Kingsway, W.C. 2. Price 1/- per copy, post free.

DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

April 20-22	Aero Club of France Grand Prix. 3rd stage
May ...	Seaplane Contests on Lake Garda, Italy
May 15 ...	Entries Close for Schneider Cup
May 21 ...	U.S.A. National Balloon Race, Alabama
June 10 ...	Race, Lugo-Trieste-Trieste-Lugo
July 16 ...	Aerial Derby
July 29-31	Jacques Schneider Cup, Venice
Sept. 4-11	Brescia Races
Sept. 5 ...	Pulitzer Trophy, Detroit, U.S.A.
Sept. ...	Gordon Bennett Balloon Race.
Sept. 25-	
Oct. 2	Aero Exhibition, Prague
Nov. ...	Paris Aero Salon

EDITORIAL COMMENT



The Cross-Channel Subsidy

CONTRIBUTOR who supplies the "well-informed" notes to one of the evening newspapers recently let himself go on the subject of the subsidies to the British cross-Channel air services. He wanted questions asked of the Air Minister as to the terms of the temporary arrangements which have been entered into between the Government and the firms concerned in carrying on the services, and, on the authority of "someone who is in the employ of one of the two firms concerned," alleged that the arrangements show a margin of profit for the transport companies out of all proportion to the risk incurred. It may have been a coincidence that almost the next day Mr. Raper asked the Air Minister for the information desired, and elicited the answer that the basis of the interim agreement is that an approved number of flights, probably one each way, is secured from loss to the company by subsidy from the Government, subject to a maximum liability. The profits, however, are limited to 10 per cent. of the receipts from passenger fares and freights, irrespective of whether the flight costs more or less than the subsidy. From this it would seem to emerge that the journalist who gathered his information direct from the stable either had his leg pulled or, unfortunately, got hold of someone who was not exactly in the best position to know the facts. A profit of 10 per cent. on the services does not seem at all an extravagant figure. In fact, we are inclined to think the Air Ministry is not to be accused of over generosity in its terms. Not that we have any complaint to make as to that. Such subsidies as we have always had in mind in connection with civil aviation are not for the purpose of enabling people to get rich quickly, but to tide the industry over the interval until services can pay "on their own"—in a word, to enable it to make ends meet. If the Air Ministry is doing no more than that it is enough, and all that the industry asks.

A Better Prospect

One thing that has tended to hamper the development of civil aviation hitherto has been the lack of adequate landing facilities and fuel supplies in various parts of the country. There is little doubt that had

these been available, passenger services would have been in active operation in places where now an aircraft is never seen. The Air Ministry recently, however, decided to throw open to pilots a large number of the Service aerodromes established during the War and to provide facilities for the landing of passengers. In view of this, aviation firms are beginning to see a little light through the clouds, but it must not be too hastily assumed that all is going to be well simply because the Air Ministry has done now what it ought to have thought of nearly a couple of years ago.

The heavy outlay necessary to acquire suitable machines, added to the want of landing accommodation and certainty of obtaining adequate fuel supplies, has hitherto kept quite a number of experienced pilots from embarking upon transport services on their own account. Now that the authorities have awakened to the fact that by affording the essential ground facilities they will be removing one of the chief obstacles to development, there are hopes that Messrs. Handley Page, in conjunction with the Aircraft Disposal Co., intend to support the action of the Ministry in a very practical manner. They will, so they have announced, provide approved, experienced pilots with a certain number of surplus Government machines suitable for transport services, on such terms as will enable all who desire to take a hand in developing civil aviation within the United Kingdom. Two types of machines, the Avro and the D.H.9, with a high reputation in connection with long-distance transport flying, have been approved for immediate delivery, and in every instance the Air Ministry certificate of airworthiness is to be furnished with the machine. We understand that only pilots of British birth are eligible to receive the aeroplanes which will be set aside under the scheme.

This is an altogether admirable plan, and one which ought to assist very materially to give to civil aviation that fillip it so badly needs. It should react all round to the benefit of everybody concerned. The Air Ministry will have the satisfaction of seeing practical use made of aerodromes and landing grounds which at present are, owing to the severe restriction of Service flying, and the almost complete paralysis which has overtaken civil air transport, lying almost derelict. Many fine pilots, with a splendid flying record behind them, will be given an opportunity of embarking upon the very business they would have chosen at the end of the War had the conditions been more propitious. The country will benefit enormously, because it is to these very pilots we must look to train the younger generation and to provide the first reserve to the active Air Force in time of war. Finally, it will be all to the good of the State that these surplus machines should be passed into active commission again. True, the Aircraft Disposal Co. contracted with the Government to take over all the surplus material belonging to the Flying Service, and at first sight it would appear as though it were the concern of the Company alone whether these machines were put into service or allowed to rot. It is not so, however, because the Company has to pay to the nation a percentage of the profits made on the disposal of stores. So that everybody should have cause for satisfaction.

In extension of the idea outlined above, it is stated that with a view to stimulating provincial interest in civil aviation, a syndicate has been formed for the

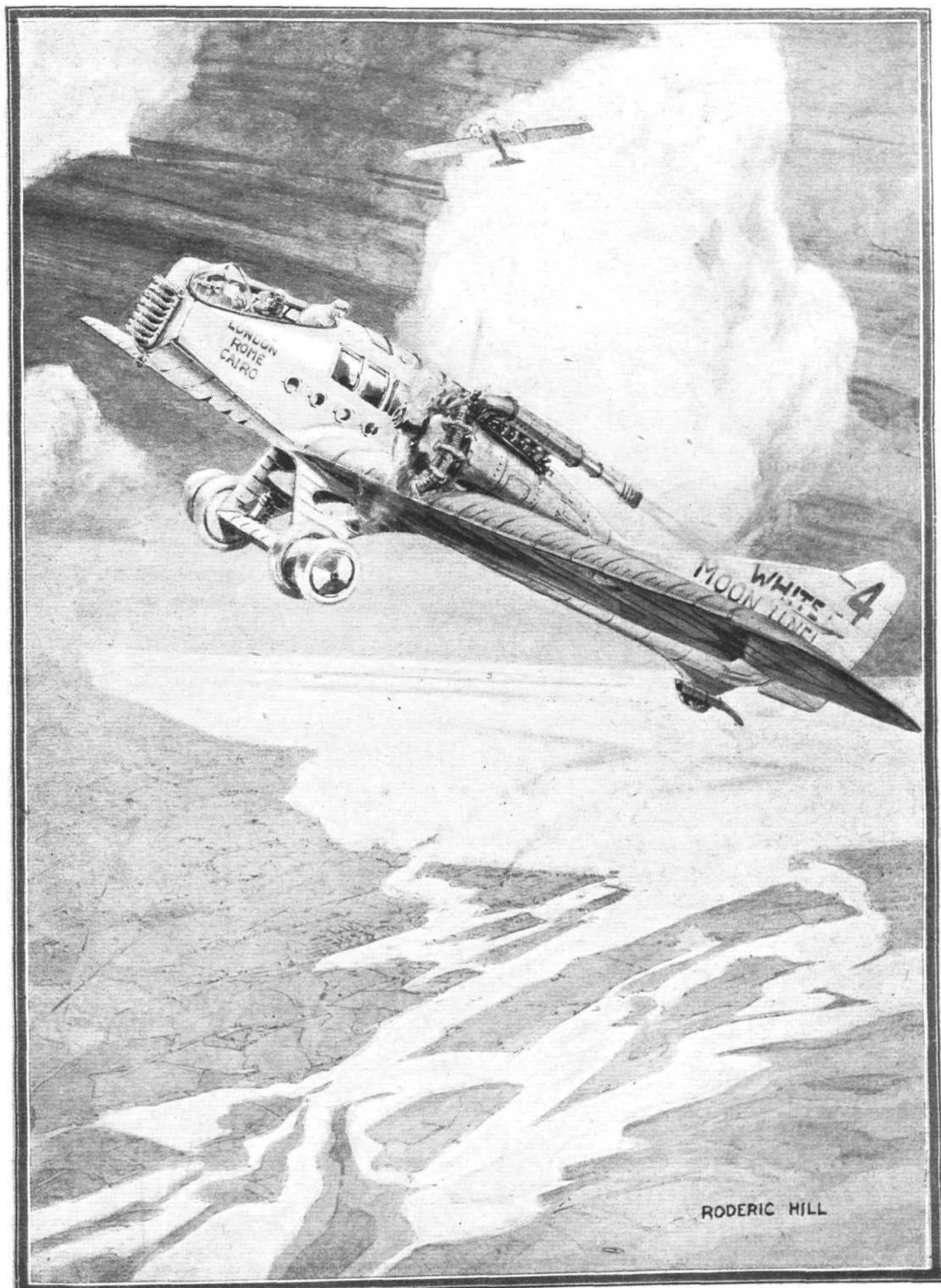
purpose of establishing an Aero Club in all the leading centres and for the promotion of cheap passenger flights. Initially, it is stated, the promoters of the scheme intend to visit the principal towns and popular resorts, where a spirited and comprehensive propaganda campaign is to be carried on. Our readers know the value we place on propaganda of the right sort, and we certainly think that this is one of the very best methods that could be adopted of bringing home to the man in the street the facilities and advantages of flight. The formation of a local Aero Club, backed up by actual flying on the spot, must necessarily foster some amount of enthusiasm at least, and once we have got that going the path is smoothed for the development of civil aviation in the district particularly concerned. When we have these clubs and demonstrations established all over the country, there will be some prospect of rapid progress. We wish the promoters of this most excellent idea every success in their enterprise.

Air Officers and the Emergency

In an official *communiqué* the Air Council express their thanks to "the thousands of ex-officers, R.A.F., who responded to the appeal to them to volunteer for duty during the emergency." It is the fact that such emergencies as that created by the strike threat of last week call forth offers of service in thousands and tens of thousands that make these crises almost worth while to show to all who may be concerned that the bulk of the people—and we would add the middle class in particular—still place citizenship before self. The country has been so torn by dissension of one kind and another that there has sometimes been a disposition to ask whether all the sacrifice that was endured in the War was worth while or not, and there have been times when one almost despaired of the future. But the arrival of an emergency like that which has so recently passed away shows that the nation is sound at the core, and that all the revolutionary talk and the stirring up of class war which is the self-imposed task of a few Bolshevik agitators are only the vapourings of a noisy minority. True, it is a poisonous minority, which does harm out of all proportion to its real value, but it is a very small and inconsiderable one after all. So long as the Government can depend upon an answer such as it received to the call of last week, there will be no need to fear for the future.

It was not only the Air Ministry which had cause to thank those who responded to its appeal. From every class of the community and for every branch of the public service volunteers were forthcoming in thousands, and we think it is very probable indeed that it was the knowledge that the nation had set its teeth and was prepared to fight the matter out to a finish that guided events into the channel along which they ultimately flowed. However, all these things are, happily, of the past, and although we still have the coal trouble with us we have, fortunately, been spared the far graver conflict which at one time seemed inevitable.

The Report of the Comptroller and Air Ministry Auditor-General on Air Ministry expenditure for the year ending March 31, 1920, contains more of the references to waste and extravagance to which these periodical Reports have accustomed us. It shows that sums



RODERIC HILL

A Twin-Engined Commercial Monoplane of the Near Future.

From the original by Roderic Hill.

amounting in the aggregate to no less than £414,828 had to be written off as irrecoverable. Losses amounting to £73,454 are laid to the account of theft, fraud, arson and gross negligence, among other amounts which have gone to swell the total of public funds which have been lost as a result of the War and its aftermath.

Naturally, the Auditor-General makes certain pointed criticisms of the administrative laxity which these losses denote. While we agree that no comment could be too severe where loss of public money is due to fraud or theft, it must not be forgotten that most of the losses incurred were due to the stress of war and to the inexperience of stores and accounting officers who were engaged in the creation of a new Service. The R.A.F. was only a year old when the period reviewed in the Report began, and it was inevitable that mistakes should be made and losses incurred, especially in view of the fact that this period was one when demobilisation was proceeding and the whole débris of the War was in process of being cleared up. In the circumstances, we are not at all inclined to blame too severely officers who were trying their best to evolve order out of a condition of things which the exigencies of the War had thrown into something very nearly approaching chaos. In war-time things can be viewed with a lenient eye which could not be tolerated for a moment in peace. It is then the business of a fighting Service to beat the enemy rather than to keep a meticulously careful eye upon expenditure, and because of this we are inclined to take a view of the Auditor-General's comments which we should be by no means inclined to take if the Report referred to, let us say, the year ending on March 31 next. All the same, these revelations regarding waste, extravagance and worse, do not form pleasant reading, and we trust that when the Air Ministry accounts for the year just ended come under review we shall not have dished up to us any more of the unedifying details which disfigure the White Paper which lies before us.

The Cape to Cairo Route
There is a strong note of criticism in the Report *apropos* the expenditure on the Cape to Cairo aerial route. It appears that a sum of approximately £25,600, in addition to an amount as yet unascertained for pay and allowances of R.A.F. personnel, was

charged in the account for expenditure of the Cape to Cairo aerial route. It appears that an understanding was reached with the Treasury that, within moderate limits, funds were available for civil aviation schemes in 1918-19. A sum of £3,000 was accordingly allotted to the Air Officer Commanding, Middle East, for the inception of this route. In June, 1919, the Air Council authorised a total expenditure of £15,000, excluding the pay of R.A.F. personnel. In July, 1920, it was ascertained that the expenditure which was administered by Army paymasters and by the Rhodesian Government in certain sections, would be approximately £50,000.

At this stage the matter was reported for covering sanction to the Treasury, who considered that the scheme should not have been prosecuted without their prior approval, and asked for an explanation of the growth of the expenditure. They also expressed the view that steps should have been taken to obtain contributions from the various African Governments. The Air Ministry have not yet replied to the Treasury enquiries, owing to delay in obtaining information, but it appears from later papers that in November, 1920, the total expenditure on the service had reached about £76,000. And there the matter rests for the moment.

We are not at all in favour of the irresponsible expenditure of public funds. The Treasury sanction is the one safeguard between the taxpayer and the great spending Departments of State, but in this case we cannot profess any great regret because somebody has apparently exceeded his authority to expend money on a work which, we are convinced, will ultimately prove of the highest value to the communications of the Empire. The trail from one end of Africa to the other has been blazed and the first flight made—the forerunner of many others and the pioneer of regular services which will bring the great self-governing Dominion of South Africa as near to the motherland as Canada is now. It was a work that had to be completed, once it was embarked upon, and if it has cost more than was estimated in the first instance, the money has been well spent and we are inclined to award praise rather than blame to those who had the courage to do the thing that would be normally irregular. But this must not be taken as a precedent, else all control over public expenditure would cease to be effective.

□ □ □ □ THAT "PULSATING" WING

THE daily Press has become greatly excited recently about the Nimführsche pneumatic wing, which is rumoured to promise to revolutionise flying by decreasing the power required to a ridiculously low figure. The figure of 10 h.p. to do the work of a 200 h.p. engine in an ordinary aeroplane is mentioned. Personally we think that these estimates should be looked upon with strong suspicion until they have been proved. It is stated that Dr. Nimführ (who, by the way, appears to have been playing the "prophet in his own country, etc.") has obtained some extraordinarily good results with large-size models. Well, perhaps he has. So have a good many model experimenters with helicopters. It appears that there is still a long way to go. Why is it, one wonders, that Dr. Nimführ has had to go outside Austria and Germany with his invention? And why have the large French sums failed to materialise? If Dr. Nimführ were in a position to demonstrate the scientific principles of his invention, there are in Germany—and in Austria too, for that matter—plenty of aerodynamic experts who would have received him with open arms. Germany, with her keenness to be first in commercial aviation, would scarcely have let such an invention go abroad if her scientists were convinced that it was scientifically sound or promised to be applicable to full-sized

machines. In France, on the other hand, it seems that any Tom, Dick and Harry (or their French equivalent) can obtain plenty of capital and unlimited unpaid publicity (which is unusual for France) when it is a question of boosting some futile helicopter experiment. A scheme like Dr. Nimführ's would appeal to the imaginative Frenchmen, but, apparently at the last moment, the ready cash failed to put in an appearance. As regards the Nimführsche invention, no reliable data are available beyond the fact that, apparently, the wings of his machine are made hollow, with flexible membranes on the lower side of the wing section. These membranes are made to vibrate rapidly by pneumatic impulses, and the effect of them on the air under the wing is said to give rise to the necessary lift and propulsion, there being no airscrews. It would thus appear that, broadly speaking, Dr. Nimführ does the same in principle pneumatically as the Constantinesco interrupter gun gear and its later developments do with oil or water. How much lift may be obtained in this manner we are not prepared to attempt to guess, but that it should be able to reduce the engine power required from 200 h.p. to 10 h.p. we beg leave to doubt. Has Dr. Nimführ gone astray in estimating his "scale effect"? We wonder.

THE AVIA B.H. (EXP.) 35 H.P. MONOPLANE

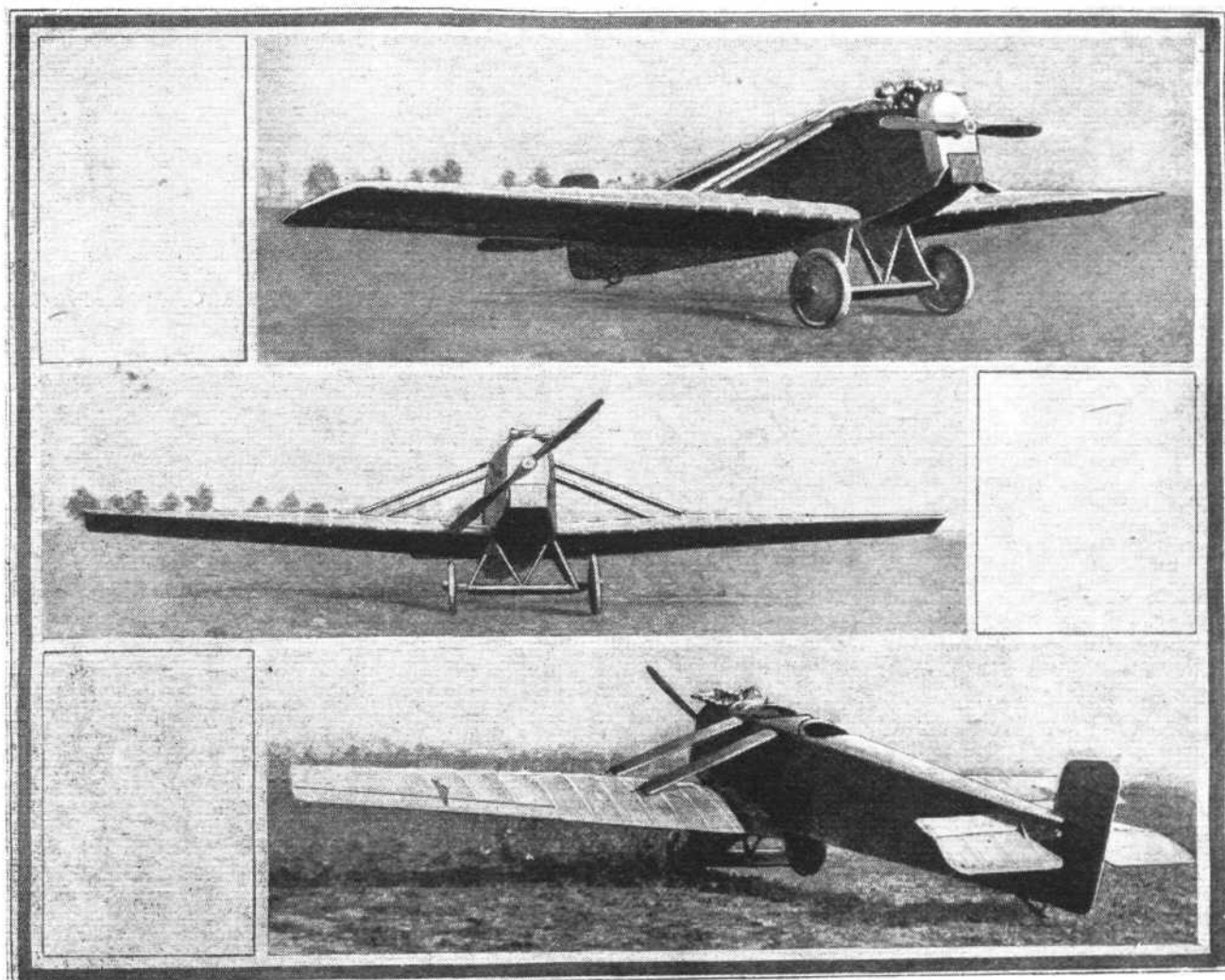
As we have previously remarked in *FLIGHT*, Czecho-Slovakia is determined not to lag behind other European Nations in aeronautical matters, and is already making rapid progress in the design and construction of new machines. Owing to their awkward political position during the War they had little opportunity of gaining actual experience in the design and construction of aircraft, as other nations did. Thus it is, that now they are starting to build up their own aircraft industry their knowledge of modern practice is somewhat limited, and they are faced with the necessity of having to worry out certain problems for themselves. In a way, we are inclined to think that this is a slight advantage, for, although the road may be uphill, are they not free from the temptation of blindly following the ruts of others?

At the Czecho-Slovak Aeronautical Exhibition held at Prague last year, a very interesting little machine was exhibited by the Avia Co., of Prague, which excited considerable attention in both home and foreign circles. We are indebted

It will be noticed that the *fuselage* is comparatively deep from nose to stern, tapering to a vertical knife-edge at the latter, and has a clean, streamline form.

Throughout the design the questions of simplicity and ease of construction have been a main consideration, with the result that the machine is built up of an exceptionally small number of component parts, and is easily assembled and dismantled. For the greater part of the construction of the Avia B.H. wood and three-ply is employed, the *fuselage* being entirely covered with the latter.

The long overhang of the wings demands rather thick spars, and these are of box construction, sufficiently strong to withstand any tendency on the part of the overhung portion of the wing to twist. Where the wings are attached to the *fuselage* the latter is provided with strong cross members. The wing attachment, and also the attachments of the bracing struts, are of the knuckle-joint type, whilst the control cable passing from the *fuselage* through the wings to the *ailerons*

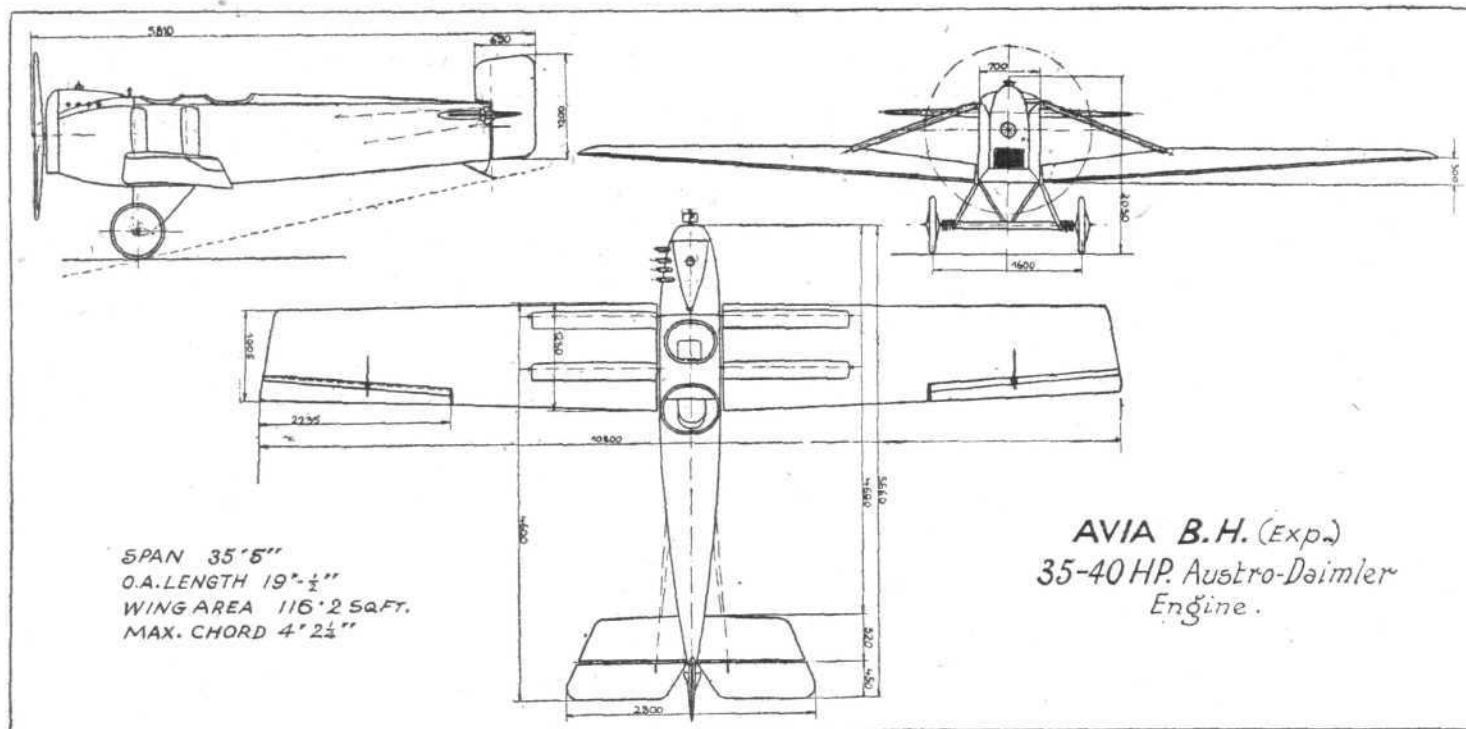


THE AVIA B.H. (EXP.) 35 H.P. MONOPLANE: Three-quarter front view, front view and three-quarter rear view.

to our Bohemian contemporary *Letectvi* for the accompanying particulars of this machine, which is known as the "Avia" B. H. Exp. It was built from the designs of Messrs. P. Benes and M. Hajn as an experiment, with the object of producing a low-powered machine for economic flying built on somewhat unusual lines. It is a two-seater monoplane having what at first glance appear to be cantilever wings, mounted on the bottom *longerons* of the *fuselage*; the wings, however, are not true cantilevers, but are braced by a pair of struts running from the main spars up to the top *longerons*, on each side of the *fuselage*. This position of the wings was chosen for the purpose of obtaining the greatest possible visibility.

The wings, which have a comparatively high aspect ratio, are of rather unusual form, for in addition to tapering from root to tip, their maximum thickness occurs at the point of attachment of the bracing struts, about one third of the span of the wing from the root. They are set at a slight dihedral angle.

has a coupling—accessible through a small window—near the wing root. There are only 14 nuts and bolts to be manipulated for dismantling or assembling. The bracing struts have adjustable ends, so that it is possible to alter the angle of the wings. With a wing loading (including weight of bracing struts) of 1.23 lbs./sq. ft., the factor of safety for the wings is 12. Previous to the first flight being made the wings were subjected to a test up to five times normal load without fracture. Tests were also made on the tail planes, which withstood successfully a load of 132 lbs. applied at each end. It should be mentioned here that the tail plane is of the cantilever type, with a non-lifting streamline section, and is divided into two units mounted near the top *longerons* of the *fuselage*, a little way above the line of thrust. The construction of the tail plane is similar to that of the wings; large divided elevators are fitted, and a balanced rudder is hinged to the stern post of the *fuselage*—no vertical fin is employed. The wings are covered with fabric, but the *ailerons*



THE AVIA B.H. (EXP.) 35 H.P. MONOPLANE: General arrangement drawings.

—which are comparatively narrow—are constructed of three-ply.

The engine is a 4-cylinder 35-40 h.p. Austro-Daimler, mounted in the nose of the fuselage, driving a 6 ft. 6 ins. walnut tractor air-screw. The radiator is mounted in the nose of the fuselage, below the engine, and is fitted with adjustable shutters. Behind the engine is a petrol tank of 13.2 gals. capacity; behind the tank is the passengers' cockpit, followed by the pilot's, in line with the trailing edge. The usual "joy-stick" control is fitted.

The landing chassis is of the Morane-Saulnier "M" type, with divided axle, the outer strut members—forming the usual V, viewed from the side—being completely covered in with three-ply. During flight the axle lies enclosed in a three-ply fairing, which really forms a small, narrow lifting plane. Provision is made for the free upward movement of the axle when landing. Rubber shock-absorbers are fitted.

During its first trials—carried out by Josef Novak—an engine of only 26 h.p. was fitted, and with the loadings at

31 lbs./h.p. and 7 lbs./sq. ft. a speed of 68 m.p.h. was obtained, and the climb was 3,300 ft. in 10 mins. Unfortunately, we have no other particulars of this machine's performance with full power. The stability is said to be remarkably good, in spite of high C.G., and it manoeuvres with great facility, and climbs quickly. The gliding angle is small, and the get-off and run along the ground on landing are short.

The following are the principal characteristics of the Avia B.H. :—

Span	..	..	..	..	35 ft. 5 ins.
Chord (max.)	..	..	..	..	4 ft. 2 1/4 ins.
Overall length	..	..	..	..	19 ft.
Overall height	..	..	..	..	6 ft. 8 ins.
Area of main planes	..	..	..	..	116.2 sq. ft.
Weight empty	..	..	..	..	582 lbs.
Weight full load (pilot and passenger)	..	..	..	..	1,012 lbs.
Weight per h.p.	..	..	..	..	23.6-25.3 lbs.
Weight per sq. ft.	..	..	..	..	7.3-8.7 lbs.

R.A.F. and Belgian Decorations

THE King has given unrestricted permission for the wearing of the following decorations conferred by the King of the Belgians on officers of the Royal Air Force in recognition of valuable services rendered in connection with the War :—

Order of Leopold

Commander.—Air-Commodore Charles Laverock Lambe, C.B., C.M.G., D.S.O., R.A.F.

Officer.—Group Captain Cyril Louis Norton Newall, C.M.G., C.B.E., A.M., R.A.F.

Order of the Crown

Commander.—Air-Commodore Frederick Crosby Halahan, C.M.G., D.S.O., M.V.O., R.A.F.

Officer.—Wing-Commander Lewis Leisler Greig, M.V.O., M.B., R.A.F.

Croix de Guerre

Air-Commodore Frederick Crosby Halahan, C.M.G., D.S.O., M.V.O., R.A.F.; Group-Captain Cyril Louis Norton Newall, C.M.G., C.B.E., A.M., R.A.F.

The Gordon Bennett Balloon Race

SEVEN nations and sixteen competitors are at present in prospect to compete in this international spherical balloon event, to start this year, it is hoped on September 18, from the Brussels Exhibition grounds—that date giving a full moon. The trophy, of which Belgium is the present holder, is challenged by three competitors from each of the following members of the F.A.I.: Aero Club of France, A.C. of Great Britain, A.C. of Italy, and the A.C. of America; the A.C. of Spain and A.C. of Switzerland are represented by one nominee each. In addition there will be two entrants from Belgium, the holding club.

Another Avro Baby "Record"

JUST by way of showing that his flight from London to Turin non-stop on the Avro Baby was not merely a lucky flight made under favourable circumstances, Mr. Bert Hinkler made another wonderful flight in Australia on April 11, when he flew the same machine from Sydney to Bundaberg, his home town, in a non-stop flight. The distance is approximately 800 miles, and was covered in under nine hours. The fuel consumed on the flight was about 22 gals. of petrol, so that the machine averaged over 35 miles to the gal., which is distinctly good. The Avro Baby used was the same as that on which Hinkler flew from London to Turin, as was also the 35 h.p. Green engine. This engine, it may be recalled, is ten years old, having originally been fitted in an early Avro machine at Brooklands in 1911. The same machine and engine, piloted by Capt. Hamersley, won the sealed handicap of the Aerial Derby in 1919, and on it Hinkler secured second place in last year's Aerial Derby.

It would be difficult to imagine anything which would better demonstrate the capabilities of the Avro Baby-Green combination than this second wonderful flight of Hinkler's, and one hopes that he may long continue such demonstration flights in his native land, to the advancement of the industry and, incidentally and deservedly, to the good of the Houses of Avro and Green.

No. 2 Aircraft Depot Officers' Association

THE next dinner will be held on Thursday, May 5, at 6.30 p.m., at "The Cock Tavern," 22, Fleet Street, E.C., morning dress.

The Association is visiting the R.A.F. Depot at Milton, Stevenston, Berks, on Saturday, June 25. All applications to be sent to the Hon. Sec., J. D. Fairbairn, "Hillsboro," Cromwell Avenue, Bromley, Kent.

THE DORNIER CS. II COMMERCIAL FLYING BOAT

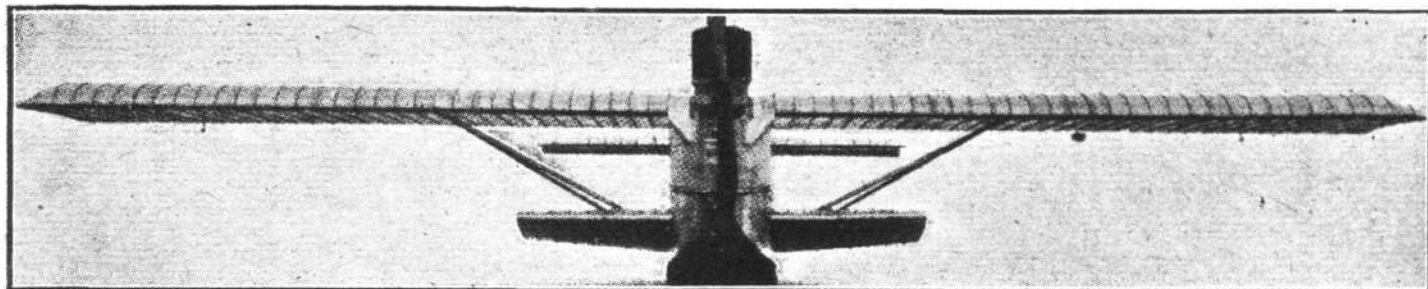
185 H.P. B.M.W. Engine

In our issue of March 31, 1921, we published an illustrated description of the Dornier all-metal monoplane, Do. C. III, produced by the Zeppelin-Lindau works. Particulars are now available of another Dornier monoplane, also all-metal. This machine is a flying boat and, like the C. III, it is fitted with the 185 h.p. Bavarian Motor Works engine, which is now so extensively used on German machines. For the illustrations and data relating to the Cs. II, as the flying boat is called, we are indebted to the German aviation journal *Flugsport*.

Although resembling in general construction and fundamental design the C. III land machine, the Dornier Cs. II differs from that type in several respects, other than those necessitated by the fact that it is a seaplane. Thus the pilot, who in

the Do. Cs. II could do the London-Paris journey in 3½ hours at cruising speed in still air, or in the same time at full power against a wind of 18-20 m.p.h. It is certainly open to doubt whether carrying six passengers at that speed and power loading (33.3 h.p. per passenger) would not be preferable, as a commercial proposition, to carrying only one passenger for each 65 horse power at a speed of 115 m.p.h. or so. It is true that having ample reserve power is a great safeguard against trouble, but at the same time, if flying is going to come down to a reasonable figure (without subsidy), some such reduction in the power required must be made.

Constructionally, the Cs. II is similar to the land machine, being largely built of aluminium alloy. The boat is formed by

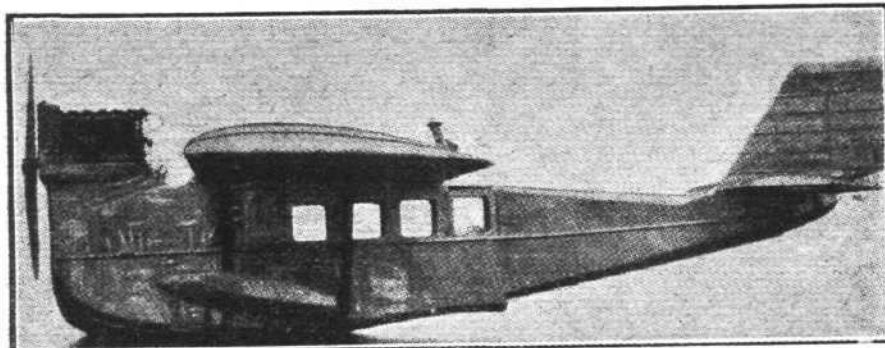


DORNIER MONOPLANE FLYING BOAT "CS. II, 1920": Front View.

the land machine is seated behind the cabin, is placed between the engine and the front wing spar. From this position it is claimed that he obtains an excellent view, not only forward but also aft, his eyes being on a level with the wing, thus enabling him to look either over or under the wing.

The engine mounting is somewhat different from that of the land machine. From the side view published herewith it will be seen that the engine is mounted high up in the nose, evidently with a view to providing sufficient clearance for the airscrew. Even then the risk of spray smashing the propeller tips would appear to be considerable, especially in anything of a seaway. On calm lakes and rivers, for which the boat is, we understand, chiefly designed, the clearance may be sufficient. This mounting of the engine certainly does provide one desirable feature for commercial work: that of accessibility. At the same time the engine is mounted so high that it has been possible to curve inwards the fuselage covering, thus

extending downwards some distance the main fuselage structure to form the planing surfaces. As will be seen from the side view of the machine, there are two steps, one slightly aft of the c.g. and one farther aft. Strictly speaking, there are three steps, as quite a minute one occurs under the tail. The bottom of the hull is of Vee formation, pronounced in front of the front main step, less so for the remaining ones. The wings are of Duralumin construction, and are of deep, non-tapered section. There is one pair of sloping struts on each side, forming the only external wing bracing. Ailerons of considerable length, but of narrow chord, are fitted, and are balanced by small auxiliary planes carried on king posts above the wing. In order to ensure lateral stability on the water, two wing roots, springing from the sides of the hull, project outward a considerable distance. This method of stabilising the machine when at rest is preferred by Herr Dornier to fitting wing tip floats, and certainly, whatever the resistance, these



Dornier Monoplane Flying Boat
"Cs. II, 1920": Side View.

narrowing down considerably the width of body immediately in front of the pilot, thereby giving him a much better view forward.

Behind the pilot's cockpit is a compartment for luggage, and aft of that again is the cabin, with seating accommodation for six passengers. Regarded as a commercial proposition, the carrying of six passengers on a machine of the flying boat type with an engine of approximately 200 h.p. only must be considered extremely promising, and it is a question whether, taking everything into consideration, some of our own air lines would not do better by using a heavier power loading, even at the expense of a considerable amount of speed. The Dornier Cs. II has a maximum speed of 93 m.p.h. and a cruising speed of 75 m.p.h., which is very good for her power loading, and not a bad speed as compared with other means of transport. Disregarding for the moment the fact that she is a flying boat,

roots may conceivably give a fair amount of lift, whereas wing tip floats would give resistance only. How these wing roots would behave in a seaway we cannot say, but for use on lakes they may be presumed to be fairly efficient.

Following are the main characteristics of the Dornier Cs. II: Length over all, 33 ft. 7 ins.; wing span, 55 ft. 9 ins.; chord, 9 ft. 10 ins.; wing area, 506 sq. ft.; maximum height, 9 ft. 1 in.; engine, 185 h.p. B.M.W.; weight of machine empty, 3,190 lbs. (including cooling water and oil in engine); weight fully loaded, 4,520 lbs.; fuel consumption per hour at full power, 85 lbs. of petrol, 4.5 lbs. of oil; consumption at cruising speed (75 m.p.h.), 66 lbs. and 4.5 lbs. per hour respectively; maximum speed, 93 m.p.h.; cruising speed, 75 m.p.h.; ceiling, 13,000 ft.; wing loading, 8.95 lbs./sq. ft.; power loading (on basis of 200 h.p.), 22.6 lbs./h.p. No figures are available regarding landing speed or climb.

Reward for Rescue

SKIPPER WILLIAM KENNEDY, of Hull, was last week presented with a silver cup from the Air Ministry for rescuing

a pilot and two observers of a Government aeroplane off Duncansby Head, when the machine fell into the sea. Members of the crew received monetary rewards.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

THE COMMITTEE, 1921

Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S. (*Chairman*).
 Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P. (*Vice-Chairman*).
 Maj.-Gen. Sir Sefton Brancker, K.C.B.
 Ernest C. Bucknall.
 G. B. Cockburn.
 Lieut.-Col. John D. Dunville.
 Col. F. Lindsay Lloyd, C.M.G., C.B.E.
 Lieut.-Col. F. K. McClean.
 Air-Commodore E. M. Maitland, C.M.G., D.S.O., R.A.F.
 The Viscount Northcliffe.
 Lieut.-Col. Alec Ogilvie.
 Lieut.-Col. Mervyn O'Gorman, C.B.
 F. Handley Page.
 Rear-Admiral Sir Godfrey M. Paine, K.C.B., M.V.O.
 Group-Capt. C. R. Samson, C.M.G., D.S.O., R.A.F.
 Sir Mortimer Singer, K.B.E., J.P.
 T. O. M. Sopwith.
 The Viscount Tiverton.

RACING COMMITTEE

A Meeting of the Racing Committee was held on Wednesday, April 13, 1921, when there were present:—Group-Capt. C. R. Samson, C.M.G., D.S.O., R.A.F., in the Chair, Major-General Sir Sefton Brancker, K.C.B., Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., Col. F. Lindsay Lloyd, C.M.G., C.B.E. and the Secretary.

Aerial Derby, 1921.—It was decided to offer the following Prizes for the Aerial Derby, 1921:—

Fastest Time (Winner of the Aerial Derby), Trophy and £400.

Handicap:—1st Prize, Trophy and £200.
 2nd Prize, £100.
 3rd Prize, £50.

It was also decided that the regulations and General Conditions should be the same as in 1920.

The Committee also discussed the arrangements for the Jacques Schneider Race, Cowes Meeting and the Oxford and Cambridge Race.

COMMITTEE MEETING

A Meeting of The Committee was held on Wednesday, April 13, 1921, when there were present:—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair, Maj.-Gen. Sir Sefton Brancker, K.C.B., Mr. Ernest C. Bucknall, Col. F. Lindsay Lloyd, C.M.G., C.B.E., Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P., Lieut.-Col. Alec Ogilvie, Lieut.-Col. Mervyn O'Gorman, C.B., Rear-Admiral Sir Godfrey M. Paine, K.C.B., M.V.O., Group-Capt. C. R. Samson, C.M.G., D.S.O., R.A.F., Sir Mortimer Singer, K.B.E., J.P., and the Secretary.

Election of Chairman.—On the motion of Lieut.-Col. Mervyn O'Gorman, C.B., seconded by Maj.-Gen. Sir Sefton Brancker, K.C.B., Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., was unanimously elected Chairman of the Club for the current year.

Election of Vice-Chairman.—On the motion of Lieut.-Col. Alec Ogilvie, seconded by Mr. Ernest C. Bucknall, Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P., was unanimously elected Vice-Chairman of the Club for the current year.

Vacancy on Committee.—Viscount Tiverton was co-opted to The Committee to fill the vacancy caused by the retirement of the Duke of Atholl on his election as President of the Club.

Stewards of the Club.—The following were elected the Stewards of the Club for the current year:—

The Earl of Lonsdale.
 The Rt. Hon. Lord Hugh Cecil, M.P.
 The Lord Kinnaird, K.T., F.R.G.S., J.P., D.L.
 Admiral of the Fleet Sir Edward Seymour, G.C.B., O.M., G.C.V.O.
 Hon. Sir Arthur Stanley, K.C.M.G.
 Lieut.-Gen. Sir David Henderson, K.C.B., D.S.O.

Appointment of Sub-Committees.—The following Sub-Committees were appointed for the current year:—

Technical Committee—Capt. W. G. Aston, Griffith Brewer, Eng.-Com. W. Briggs, R.N., Air-Commodore E. M.

Maitland, C.M.G., D.S.O., R.A.F., Maj. R. H. Mayo, Lieut.-Col. Mervyn O'Gorman, C.B., The Viscount Tiverton, Lieut.-Col. H. T. Tizard, and Howard T. Wright.

Racing Committee—Maj.-Gen. Sir Sefton Brancker, K.C.B., G. B. Cockburn, Col. F. Lindsay Lloyd, C.M.G., C.B.E., Air-Commodore E. M. Maitland, C.M.G., D.S.O., R.A.F., N. C. Neill and Group-Capt. C. R. Samson, C.M.G., D.S.O., R.A.F.

House Committee—Maj. H. Graeme Anderson, Ernest C. Bucknall, Herbert J. Corin, Lieut.-Col. F. K. McClean, D. C. MacLachlan, J. Stewart Mallam, and D. G. Murray.

Finance Committee—Ernest C. Bucknall, Lieut.-Col. F. K. McClean, J. H. Nicholson, and Lieut.-Col. Alec Ogilvie.

Flying Services Fund Committee—H.R.H. The Duke of York, K.G., Lieut.-Col. Alan Dore, D.S.O., Chester Fox, Squadron-Leader T. O'B. Hubbard, M.C., R.A.F., and Group-Capt. C. R. Samson, C.M.G., D.S.O., R.A.F.

Library Committee—C. G. Grey, Major C. C. Turner and Howard T. Wright.

Joint Standing Committee of the Royal Aero Club and the Society of British Aircraft Constructors—Lieut.-Col. F. K. McClean, Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P., Lieut.-Col. Alec Ogilvie, and Rear-Admiral Sir Godfrey M. Paine, K.C.B., M.V.O.

Racing Fund.—In order to carry out the proposed Racing Programme for this year the Committee voted a further sum of One Thousand Pounds to the Racing Fund.

Election of Members.—The following New Members were elected:—

Peter Chalmers Mitchell, C.B.E., F.R.S., LL.D., D.Sc.
 Clive Rassenden Verey.

Life Membership.—An application for Life Membership from Mr. William Wilson, J.P., was approved.

Flying Services Fund.—Report of Meeting of Flying Services Fund Committee held on March 17, 1921, was received and adopted.

Aviator's Certificate.—The following Aviator's Certificate was granted:—

7914. Charles Edward Nelson Smith.

Aeronaut's Certificate.—The following Aeronaut's Certificate was granted.

278. Charles Cyril Turner.

INTERNATIONAL AVIATION RACE MEETING: THE AERIAL DERBY

(Under the Competition Rules of the Royal Aero Club and the Regulations of the Fédération Aéronautique Internationale)
AT THE LONDON AERODROME, HENDON, N.W.
 (By arrangement with the Grahame-White Co., Ltd.),
ON SATURDAY, JULY 16, 1921

Prizes.—The following Prizes will be presented by the Royal Aero Club:—

Fastest Time (Winner of the Aerial Derby), Trophy and £400. Handicap: 1st Prize, Trophy and £200; 2nd Prize, £100; 3rd Prize, £50.

Regulations

Qualification of Competitors.—The Competition is open to persons of any nationality holding a licence issued by any Aero Club affiliated with the Fédération Aéronautique Internationale.

Organisation.—The Competition shall be conducted by the Royal Aero Club under the Competition Rules of the Royal Aero Club and the Regulations of the Fédération Aéronautique Internationale.

Entries.—The Entry Fee is £10. This fee, together with the Entry Form, must be received by the Royal Aero Club 3, Clifford Street, London, W.1, not later than 12 noon on Wednesday, July 6, 1921.

Course.—The Course is approximately 200 miles, and will consist of a double circuit of London, starting from the London Aerodrome, Hendon, with the following turning points:—Brooklands Aerodrome, Weybridge, Epsom, West Thurrock, Epping and Hertford.

Offices: THE ROYAL AERO CLUB,

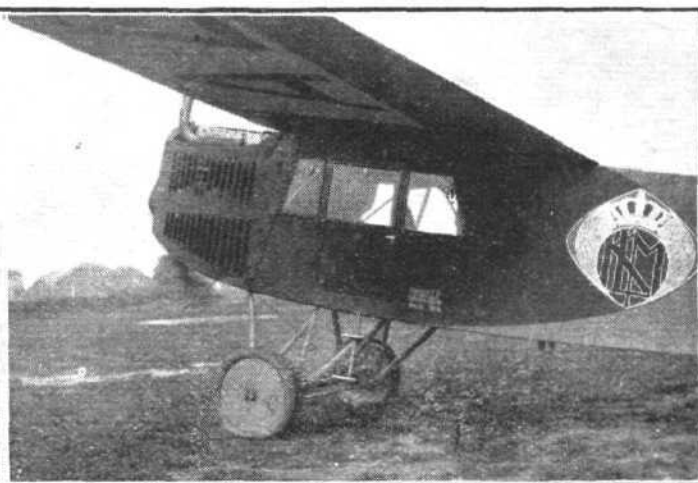
3, CLIFFORD STREET, LONDON, W.1.

H. E. PERRIN, Secretary.

THE OPENING OF THE K.L.M. LONDON-AMSTERDAM SERVICE

ACCORDING to programme the air service between London and Amsterdam was opened on Thursday of last week (April 15). The machines used by the K.L.M. (*Koninklijke Luchtvaart Maatschappij*) on this service are of the Fokker type F. III, similar to the machine described in FLIGHT of October 7, 1920, with the exception that 230 h.p. Siddeley "Puma" engines are fitted. Also the cabin arrangement has been somewhat redesigned, seating now five passengers, three facing forward and two facing aft. Another innovation is the placing of the pilot's seat, which is now at the side of

start on Thursday. It was originally intended to have an official ceremony for the opening of the service, representatives of the Dutch Government, the Air Ministry, etc., being expected to witness the start of the first machine from Croydon. However, the strike and general unsettled condition obtaining last week disarranged the programme somewhat, the first machine leaving from this side without any ceremony about 10.15 a.m. on Thursday, arriving at Amsterdam at 2.0 p.m. A distinguished gathering witnessed the start of the other machine, which left Amsterdam



THE START OF THE K.L.M. LONDON-AMSTERDAM SERVICE: On the left one of the new Fokker F. III machines in use by this firm. On the right a close-up view of the cabin, engine housing, etc. The engine fitted is a 230 h.p. Siddeley "Puma." The machine has seating accommodation for five passengers.

the engine, more or less after the fashion of the "K" type London omnibuses. In other respects the machine remains much as the previous type. A small alteration has also been made to the "roof" over the pilot, *i.e.*, the leading edge of the wing. This has now been scooped out, and is said to give much better freedom from draught than did the old arrangement, which left much to be desired from this point of view.

The first of the K.L.M. Fokkers arrived "unofficially" on Tuesday of last week, so as to be in readiness for the

(Schiphol aerodrome) about a quarter of an hour after the arrival of the machine from England. This machine arrived at Croydon at 6 o'clock, so that a passenger could have made the journey to Amsterdam and back between the hours of 10 a.m. and 6 p.m. Not that such a trip would leave any time for doing business in Holland, but it goes to show how flying does help to speed-up travel. The Dutch London-Paris service is now in full swing, and one only regrets that the service is not run by a British firm. One consolation is, however, that the engines and pilots are British.

LONDON TERMINAL AERODROME, CROYDON

Monday evening, April 18

THE outstanding event of the week has been the opening of the London-Amsterdam service by the Royal Dutch Air Service Co., Ltd. The first Fokker monoplane arrived on Tuesday, piloted by Mr. Olley, late of Handley Page, but the service did not commence until Thursday. Col. Searle, managing director and liquidator of Aircraft Transport and Travel, Ltd., was present to witness the start of the first machine for Amsterdam at 10 a.m. on Thursday, whilst quite a crowd of airway celebrities assembled during the afternoon to welcome the first scheduled monoplane from Amsterdam.

I understand that the Royal Dutch Air Service Co., Ltd., have engaged four British pilots in addition to two Dutch and three German. Needless to say we are not likely to see the Germans at Croydon; they are to fly on the Rotterdam-Hamburg route.

The Air Ministry were busy making arrangements for emergencies in case of the strike that was not. They have installed a petrol-electric power plant, and have erected temporary hangars. These will be of use in providing accommodation for the ever-growing number of aeroplanes that are visiting the air-port.

The Napier-engined Westland has now been handed over to the Instone Air Line. I understand it is to be used only as a stand-by, and not put on the airway unless the D.H.18's or the Vickers-Vimy break down.

The joy-riding firms have had rather a bad week, as the weather during the week-end did not tempt the average joy-rider into the air. The Surrey Flying Services have suffered

by the strike emergency preparations, one of their pilots and their ground engineer being on the reserve.

Traffic between London and Paris has been about normal, but there is always a rush on Saturday. On this last one, for instance, there were not enough machines to cope with the demand, and many would-be passengers had to be refused. The same remarks apply to the traffic from Paris, the Instone Air Liner "City of Paris" arriving at Croydon with a full load.

Some receptacle that can be used in case of air-sickness should be provided on these machines. On this particular journey, which was very bumpy, quite half the passengers were ill, and as no provision is made for such an event, it must have been extremely unpleasant for the rest of the passengers. The Farman "Goliaths" are fitted with hideous receptacles that remind one forcibly of the dentist's parlour, and consequently arrive as clean and sweet as when they start.

Mr. Shaw has completed his tests of the D.H. 14 with a Rolls-Royce "Condor" engine, delivering the machine to Martlesham Heath on Thursday.

Quite a number of aeronautical experts have visited the aerodrome during the week to see the Fokker monoplane. On Sunday, Mr. Hadyn-White, of the Blackburn Aviation Company, arrived early in the morning in company with Mr. Courtney.

Mr. Courtney has been carrying out a series of tests on an "Alula" wing fitted to a D.H. 6 fuselage with a B.R. 2 engine. He tells me he is to test the Armstrong-Whitworth "Sinai" with the two Siddeley "Tiger" engines.

THE MONACO SEAPLANE MEETING

No British Machines Entered

LAST year's seaplane meeting at Monaco was a bit of a fiasco. It had, however, one advantage over this year's meeting in that a whole British machine—and a very fine one at that—was entered. It is true that this machine, the Fairey seaplane, did not arrive, owing to the sudden and urgent call to America of the Fairey pilot Nicholl, but at any rate there was enough kick left in the British aircraft industry to enter one machine. This year we do not appear to have got even as far as to enter a machine. For the sake of British prestige abroad this is much to be regretted, although from a practical point of view it probably does not matter greatly. From the list of entries published below, it would appear that there are several British machines in existence which would be pretty certain of doing well in the various competitions, and one would very much have liked to see them among the competing machines.

The rules governing the various competitions during the Monaco meeting were published in the Official Notices of the Royal Aero Club in our issue of February 3, 1921, and we do not, therefore, propose to give more than the briefest reference to them here. The meeting is taking place over the period April 13-April 20, and the various contests include:—

(1) *Flight from Monaco to Ajaccio (Corsica) and back*, under conditions which are intended to represent those of an aerial mail service. Each machine must carry at least 440 lbs. of ballast to represent the weight of mails. The winner will be the competitor who completes the journey out and back (305 miles) in the shortest time.

(2) *Speed and weight-carrying competition; Monaco-Cannes-San Remo-Monaco (two circuits—176 miles)*. In this contest the weight-carrying machines have to carry a useful load of at least 440 lbs. The speed machines apparently need carry the pilot only and enough fuel to see them through. The weight-carrying contest will be held in the morning, that for the speed machines in the afternoon.

(3) *Speed contest. Monaco-Cannes-Monaco-Mentone-Monaco (about 78 miles)* for pure speed machines.

In addition to these main competitions there are scheduled various side-shows, such as daily flights between 11 a.m. and noon for establishing the greatest speed over a nautical mile, altitude contests, alighting contests, and balloon "strafing," which latter with luck should provide quite a good deal of sport.

The following is a list of the entrants for the various competitions:—

Monaco-Ajaccio-Monaco Flight: 1, Nieuport; 2, Breguet 14 A/2; 3, Caudron C. 39; 4, Farman, type G.L.; 5, Savoia S. 12; 6, Savoia S. 22.

Speed and weight carrying contest: 1, Nieuport; 2, Breguet 14 A/2; 3, Caudron C. 39; 4, Caudron C. 51; 5, Savoia S. 12; 6, Savoia S. 22; 7, Savoia S. 21; 8, Farman, type G.L.; 9, Spad.

Speed Race: 1, Spad; 2, Breguet 14 A/2; 3, Farman, type G.L.; 4, Caudron C. 51; 5, Savoia S. 12; 6, Savoia S. 22; 7, Savoia S. 21.

Altitude Competition: 1, Spad; 2, Breguet 14 A/2; 3, Farman, type G.L.; 4, Caudron C. 51; 5, Savoia S. 12.

Alighting Tests.—1, Spad; 2, Breguet 14 A/2; 3, Farman, type G.L.; 4, Caudron C. 51; 5, Savoia S. 12; 6, Farman.

Balloon destruction: 1, Spad; 2, Breguet 14 A/2; 3, Farman, type G.L.; 4, Caudron C. 51; 5, Farman.

Speed over nautical mile: 1, Spad; 2, Farman, type G.L.; 3, Savoia S. 22; 4, Savoia S. 21; 5, Savoia S. 12.

The Breguet 14 A/2, it will be seen, figures in the entire series of contests, except the speed over a nautical mile. Why the good old "Bray-gu-ett" funks that particular stunt one does not profess to know.

Progress of the Meeting

The first of the competitions was the Monaco-Ajaccio-Monaco flight. Few of the machines entered for this competition were ready to pass their eliminating trials at the

prescribed time. Why is it, one wonders, that such an event as this, the time and conditions of which are known many months beforehand, invariably finds the competitors unprepared at the last moment? In this case two machines only were ready. One of these, the Breguet flown by Roget, who had with him as passenger a cinematograph operator from Pathé Frères, had engine trouble during a test flight, and in alighting broke a float, and the machine gradually heeled over and was on the point of sinking when a motor-boat rescued Roget and his passenger. The Breguet was towed into Monaco harbour, where the faithful old salvage vessel "Polyphème," which is "assisting" again this year, soon hoisted her on to the quay. The accident thus fortunately had no serious consequences other than disabling the Breguet. As this machine was entered for all the competitions one hopes that the firm will have a spare machine available. At the moment this does not appear to be the case, as Roget is stated to be *hors de combat* for the Corsica flight. The Italians had not arrived on April 14, but four of the flying boats from the Naval Air Station at St. Raphael arrived in great style, much to the gratification of the local inhabitants. On April 13 Maicon, the well-known Caudron pilot, successfully passed his climbing test, getting to a height of 2,000 metres in 32 minutes with a total load of 1,125 kilos. Maicon's Caudron is of the three-engined type twin-float seaplane. The engines are 130 Clergets. On April 15 the flight to Ajaccio was to have started. Maicon was ready, but the weather was considered unfavourable, wireless messages from Corsica reporting showers and a rough sea. Janello on the 450 h.p. Savoia S. 12, and Maddalena on the 300 h.p. Savoia S. 22, left Sesta-Calenda on Lake Maggiore together in very thick weather, but soon got separated. After cruising about for a considerable time, and sometimes being very far out of his course, Maddalena finally managed to get his bearings, and arrived safely at Monaco. Janello was reported to have alighted at an Italian port, nobody seemed to know which.

Although the weather was very rough, and with very low visibility, Maicon succeeded in making the out-and-home journey to Corsica on April 16. Leaving Monaco at six minutes past seven in the morning, on his Caudron C. 39, he arrived at Ajaccio 8.58, his flying speed working out at 83 m.p.h. The return journey was started at 12.53, and Maicon arrived back at Monaco 3.18, averaging 62 m.p.h. only on this journey, owing to the wind. Maicon is thus the winner of the first prize of 40,000 francs. It looked at one time as if he would never make the return journey in that particular machine. About twenty minutes after his arrival at Ajaccio, Maicon had delivered his mail bag to the official at Ajaccio, and had received a similar one to take back to Monaco. A start was made at once, but after getting away Maicon discovered that it was doubtful whether he would have enough petrol for the return journey. He therefore returned to Ajaccio, and mechanics hurriedly commenced to fill up his tanks. In doing so they slopped the petrol carelessly over the engine cowls, etc., with the consequence that when the engines were started a spark from the starboard wing engine set the petrol on fire. Maicon and his mechanic succeeded in getting the fire under control by means of the fire extinguishers carried on board, and a very nasty ending was thus avoided. This little episode, however, delayed the start for the return journey, but as Maicon was the only competitor this did not bother him much.

On April 17 the first speed contest, Monaco-Mentone-Cannes-Mentone-Monaco (78 miles), was won by Poiret on a Caudron. He first made the flight in 39 minutes 50 seconds, but as he had crossed the starting line in flight instead of taxiing he was disqualified. After about an hour's rest he made another start, and completed the course without incident in 45 minutes, 27½ seconds, thereby winning the first prize of 12,000 francs. Lalouette on a Spad passed his climbing test, but damaged his machine in alighting. The second speed contest is to take place on April 20.

AVIATION IN PARLIAMENT

Territorial Air Force

BRIG.-GEN. COLVIN, on April 13, asked the Secretary of State for Air whether, in order to encourage aviation, he will consider the advisability of enrolling volunteers in the Air Force to be administered by Territorial associations, and to receive free instructions in flying and a grant for uniform on attaining a certain standard of proficiency?

MR. McCURDY (Joint Parliamentary Secretary to the Treasury): A draft of a scheme for the formation of a Territorial Air Force is now under discussion with the various authorities concerned, and I hope that it may be possible to inaugurate it during the course of the present year.

BRIG.-GEN. COLVIN: Is there any intention of forming a civilian Air Force reserve?—MR. McCURDY: I must ask for notice of that question.

R.A.F. and Supplementary Estimates

ON April 18, following the proposal: "That an additional number of Air Forces, not exceeding 10,000, all ranks, be maintained for the Service of the United Kingdom of Great Britain and Ireland at home and abroad, exclusive of those serving in India, during the year ending on the 31st day of March, 1922,"

Capt. Guest (the Secretary of State for Air) said the services performed by the Air Force during these times would not be large, but would be technical and vitally important. Other portions of the Reserve called up under the same Proclamation would be for the assistance of the military and also for the protection of the material, which is extremely vulnerable and valuable.

THE PASSAT "HELITHOPTER"

HELICOPTERS, which are very much in the air—literally—just now, are not the only rivals to more orthodox methods in the present field of aeronautical development. M. Passat, who has been experimenting with ornithopters for a considerable number of years, is now at work on a new type of machine, which he aptly calls a "Helithopter"—a sort of crossbreed between a helicopter and an ornithopter. We understand that M. Passat, as a result of his past experiments—which, we may mention, have been recorded in *FLIGHT* on various occasions since 1909—with the latter type of machine, has come to the conclusion that the mechanical difficulties are, at present, against the successful realisation of the flapping wing machine. Although he actually got his last ornithopter to lift, he had to abandon further trials owing to the constant mechanical defects which occurred, due to the various strains set up. Nevertheless, he has, he says, obtained much valuable data which are aiding him considerably in his present experiments.

We do not, at present, propose to describe this new "Helithopter" in detail, but will only just briefly refer to the principle employed. When inspecting the experimental machine, which is fitted with a 10 h.p. A.B.C. 2-cyl. engine, and is very roughly and simply designed and constructed—and here we think M. Passat would find it much to his advantage if he reconstructed the machine on improved lines before continuing further experiments—we must admit we were somewhat impressed with the demonstrations given us.

Briefly, the machine consists of four bird-like wings arranged radially on a shaft driven by the engine. A simple—and, we should think, quite a practical—cam arrangement turns each wing, as the whole revolves, in such a way that on its down stroke it is in a horizontal position, whilst on the up stroke it "feathers" with its leading edge in the direction of motion. The result is that, according to the angle at which the wing is set, an upward or forward thrust is obtained. In the demonstrations referred to above, when the little A.B.C. was speeded up, the wings pulled the machine—or more strictly speaking the wooden scaffold on wheels carrying engine and wings—forward with apparent ease.

There appeared to be, also, a distinct tendency to lift in a vertical direction. M. Passat tells us that he obtains a lift of well over 200 lbs. and a forward thrust of 75 lbs. with the 10 h.p. engine. In the full-sized machine it is proposed to provide two or more pairs of wing-units, arranged on the port and starboard sides of the body. When all wing-units are working direct vertical lift is obtained, but slowing down the forward ones will cause the nose of the machine to drop, and a forward motion results.

Although M. Passat has many difficulties yet to overcome, he has undoubtedly hit on a very interesting problem, and one that certainly deserves further investigation. We shall watch future developments closely, and hope presently to give our readers further particulars.

ROYAL AIR FORCE MEMORIAL FUND

A MEETING of the Executive Committee of the above Fund was held at the offices of the Fund, 7, Idlesleigh House, Caxton Street, on the 14th inst., Lord Hugh Cecil in the Chair. The members of the Committee present were:—

Lady Leighton, Dame Helen Gwynne-Vaughan, Mrs. Barrington Kennett, Sir Charles McLeod, Air Vice-Marshal A. V. Vyvyan, H. E. Perrin, Esq., and W. S. Field, Esq.

The list of donations received since the last meeting, on the 10th March, showed the sum of £1,005 1s. 1d. as having been raised, which was regarded as very satisfactory.

The amount of Grants made since the same date amounted to the sum of £104 14s. 1d., in addition to which the Officers Association have been reimbursed by a considerable Grant in aid of assistance given by that Association, on behalf of this Fund, to ex-officers, R.A.F., and their dependents.

The constitution of a newly appointed sub-committee to deal with cases of appeal from the rank and file, and widows and orphans, was reported to consist of the following:—

Mr. H. E. Perrin (Chairman), Mr. W. S. Field, Mrs. L. M. K. Pratt-Barlow, and Wing-Commander Sidney Smith, D.S.O.

This sub-committee meets fortnightly and assists the Secretary in making grants in cases where he has not found himself able to dispose of the case, by a small grant, in the meantime.

The Committee approved of the purchase of a Presentation at the Royal School for Daughters of Officers of the Army, Bath, the Presentation costing £240, in addition to which £20 per annum will be paid in fees, and extras up to £7 10s. per annum. The child selected must be the daughter of an Officer of the Air Force who has held previous commissioned rank in the Army or Royal Marines. It is hoped to place a suitable candidate at the School in the Autumn of 1922.

The Secretary reported that Messrs. Hampton and Sons had found themselves able to dispose of "Heath End," Ascot, for the sum of £6,000.

The second list of subscriptions and donations to the Fund will be published in a few days' time in the newspapers, and will embrace the period from the 21st July, 1920, to the 31st March, 1921.

ROYAL AIR FORCE NURSING SERVICE

REGULATIONS regarding conditions of service in the Royal Air Force Nursing Service, which was established by Royal Warrant on January 27, 1921, have been issued.

The Service consists of a Matron-in-Chief, Matrons, Senior Sisters, Sisters and Staff Nurses. Candidates are required to join as Staff Nurses, and appointments, which are subject to a satisfactory probationary period of six months, are given to approved persons of British parentage, over 25 and under 35 years of age, who possess a certificate of training for at least three years at a large Civil hospital in the United Kingdom.

The salaries of the various grades are as follows:—

Staff Nurses ..	£60 per annum, rising by annual increments of £2 10s. to £65.
Sisters ..	£75 per annum, rising by annual increments of £5 to £85.
Senior Sisters	£85 per annum, rising by annual increments of £10 to £95.
Matrons ..	£115 per annum, rising by annual increments of £10 to £185.

In addition, charge pay, not exceeding £45 per annum, is granted to matrons according to the magnitude of their charges, and a weekly allowance of 24s. 6d. to all members in lieu of board and washing. Furnished quarters, fuel, light

and attendance are normally provided, but where this is not the case an allowance in lieu is granted.

An initial grant of £20 is made toward the cost of purchase of the prescribed uniform which members are required always to wear when on duty and when attending official or public entertainments, and an upkeep allowance of £5 for the second year and £10 for the third and subsequent years.

Members of the Royal Air Force Nursing Service may retire at the age of 50 or after 20 years' service, and retirement is compulsory at the age of 55. Retired pay, based on service and rank, is issued up to the following maximum rates, which are subject to revision in five years' time:—

Matrons, £170; Sisters, £75; Staff Nurses, £55.

Members employed in the Royal Air Force Temporary Nursing Service and previously employed in the Navy or Army Nursing Service may count the period of such service toward retired pay.

A nurse with less than ten years' service will not be eligible for retired pay, but provision is made for the issue, under certain conditions, of retired pay and gratuities in the event of such service being terminated owing to disablement, sickness or unfitness.

Full particulars of the Service and forms of application for appointment may be obtained from the Matron-in-Chief, Air Ministry, Kingsway, London, W.C. 2.

CORRESPONDENCE

The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.

THE GLENN MARTIN HIGH-LIFT WING

[2041] In connection with your note in FLIGHT on the Glenn Martin No. 2 Wing, I should like to make two or three comments.

The highest lift coefficient yet published for the Handley Page wing, as far as I am aware, makes $C_L = 0.8$ (absolute units), or $L_c = 0.00408$ (lbs. per sq. ft.-m.p.h. units). The comment was made that with several slots the coefficient can be raised to close upon $C_L = 2.0$, but no indication was given that any such lift had actually been attained. The article containing these statements appeared in FLIGHT for October 28, 1920. It is possible that you have information not yet made public, or that we have overlooked some other data on the Handley Page Wing. We should be glad to obtain any information you can give us on this subject.

In regard to the efficiency of Glenn Martin No. 2 at high speeds, you have apparently mistaken the statement in our letter. It does not refer to the maximum L/D, which, although high for a wing of this thickness, does not compare with that of the best thin wings. However, at an incidence corresponding to twice the minimum speed the L/D of Glenn Martin No. 2 with flaps is 15.1, and for three times the minimum speed, 8.4. The corresponding figures for the R.A.F. 15 are 14.5 and 7.7. Furthermore, these figures contain no allowance for reduction of parasite resistance by use of internal bracing in the case of Glenn Martin No. 2.

For further information reference should be had to the Journal of the Society of Automotive Engineers, for March and April of this year. Prior to the publication of the report in the Journal, we did not feel at liberty to issue detailed descriptions or data. We agree with you that this wing is nothing to get wildly excited about. It has specific uses. Where high speed or reduction of wing area must be attained we believe it to be the best wing now available. The variation of camber in flight is excellent in theory, but difficult to operate in practice. It is rumoured that the Handley Page Company has not yet succeeded in perfecting a satisfactory operating mechanism for the Handley Page wing. The Glenn Martin No. 2 involves no detailed construction differing from current practice, since flaps and ailerons are alike. We, therefore, feel that at the present time it is one of the half-dozen most valuable wings at the disposal of the aeronautical engineer.

C. D. HANSCOM, Chief Engineer.

[Since Mr. Hanscom wrote this letter, the figures relating to the Handley Page wings have been published, and show

that the claim advanced in the letter to which we referred, i.e., that the Martin No. 2 wing is "the highest-lift wing in the world," does not hold. The data supplied with the drawing of the wing section, published in our issue of February 17, 1921, were of such meagre nature as to fail to substantiate the claims made. Since then the figures relating to the Martin No. 2 have been published, and show a maximum L_c of .0040 (0.784 abs.) and a maximum L/D of 14. The L_c of 1.02 and the maximum L/D of 15.1 appear to refer to the section fitted with flaps. As no mention was made of this fact in the original letter, we had no means of knowing that the section was not to be judged as an ordinary fixed section. Undoubtedly, as fitted with flap gear the Glenn Martin No. 2 is a very good wing, considerably above the average.—Ed.]

THE NAPIER "LION" AND LONDON-PARIS AIR SERVICE

[2042] In reference to an advertisement of an engine firm in this week's issue of FLIGHT, in which they state that all the aeroplanes used on the London-to-Paris Air Service are fitted with their type of engine, we would say that this statement is apparently made on the strength of an article appearing in The Times of March 19th, 1921, which states that the Vickers-Vimy, D.H.9, D.H.19s, and Handley Page aeroplanes are being used on the Service.

As is well known, there is no such machine as D.H.19, and this is obviously an error for D.H.18, which is fitted with a single 450-h.p. Napier aero engine. You will realise that such a statement in this firm's advertisement is very damaging to us, bearing in mind the fact that the Airco 18 machines fitted with Napier engines are the most satisfactory and economical employed on the Service.

The 450-h.p. Napier aero engine is the only single engine which could lift a D.H. 18 machine, which carries eight passengers in addition to luggage and pilot. It might also be recalled that this engine further proved its reliability, economy, and speed in open competition, as the machines which secured the highest prize in each class of the Air Ministry Competitions were fitted with Napier engines.

We should be obliged if you would kindly correct the misleading statement which has appeared.

F. H. JONES,

Publicity Manager, D. Napier and Son, Ltd.

14, New Burlington Street, W. 1, April 15.

ROYAL AERONAUTICAL SOCIETY NOTICES



Honorary Members.—In response to a request from the Air Ministry, temporary Honorary Membership of the Society has been offered to the following officers representing Foreign Governments while on service in this country:—

Cmdr. Evers (Denmark), Cmdr. Sable (France), Chevalier W. Coppens (Belgium), Maj. Graziani (Italy), Maj.-Genl. Itamy (Japan), Capt. Kobayashi (Japan), Capt. de

Vaisseau (Netherlands), Capt. Scott Hansen (Norway),

Lieut.-Col. Rich (Spain), Lieut.-Col. Mossberg (Sweden), Capt. G. Hain (Sweden), Cmdr. Tiselius (Sweden), Maj. Melvin Hall (U.S.A.), Lieut. R. G. Pennoyer (U.S.A.).

Donations.—The Council desire gratefully to acknowledge the receipt of a copy of "The History of the 24th Squadron R.A.F." by Capt. A. E. Illingworth and Maj. V. A. H. Robeson, from Maj. Robeson.

Library.—The following book has been received and placed in the Library: "Meteorology," by A. E. M. Geddes, O.B.E., M.A., D.Sc.

W. LOCKWOOD MARSH, Secretary

AIR MINISTRY NOTICES

Summer Time, 1921: Holland

ADDENDUM to Notice to Airmen No. 31 of April 1st, 1921:—

1. **Holland.**—Summer time (i.e., an advance of one hour on G.M.T.) came into operation in Holland on the night of April 3/4, 1921. Normal time will be resumed on the night of September 25/26, 1921.

(No. 34 of 1921.)

Aerodromes for Civil Use: Amendments

NOTICE to Airmen No. 33 of 1921 (Aerodromes for Civil Use: Consolidated List) is amended as follows:—

LIST B. Aerodromes available for civil machines in emergency only. (a) **Permanent Service Stations.**

The following should be added:—Old Sarum (Salisbury).

The following should be deleted:—Houton Bay (S), Howden (Airship), Stonehenge.

LIST B. (b) **Stations temporarily retained for Service purposes.**

The following should be added:—Houton Bay (S) (Thurso), Howden (Airship), Stonehenge (Amesbury).

(No. 35 of 1921.)

Subsidy for Swedish Civil Aviation

THE Swedish Government has applied for a grant of 170,000 kroner for 1921, and 360,000 kroner for 1922. In addition, in order to improve the State Meteorological Ser-

vice, a grant of 60,200 kroner for 1921 and 60,800 kroner for 1922 is requested. These sums are less than were recommended by the Swedish Aeronautical Commission, and given in a recent issue of FLIGHT.

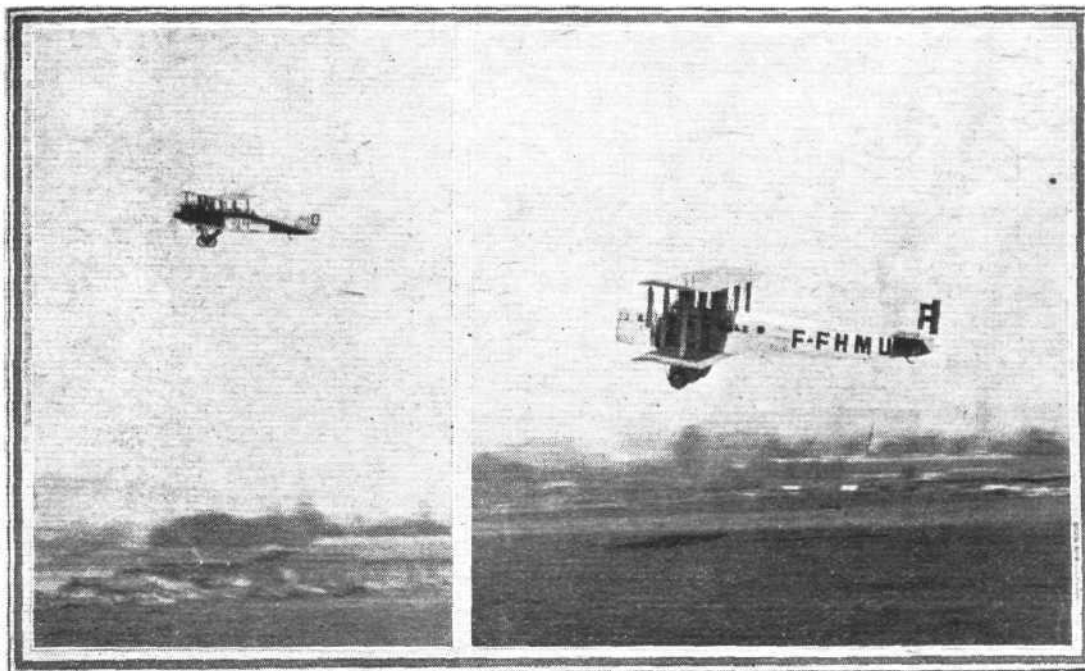
AIRISMS

FROM THE FOUR WINDS

"GYROPLANE" is a name proposed by M. Louis Breguet to be substituted for "Helicopter."

FROM this week Waddon Aerodrome will be the arrival and departure air-port of London for all the Continental air-services.

THE *Daily Mail* is ever astute in obtaining bold advertisement and encouraging enterprise through the same weapon. With the inauguration of the London-Amsterdam Air-Service last week, the proprietors commenced sending the paper by this route, with, we can well believe, very gratifying



Two Departures
from Croydon :
On the right the
French Goliath,
"F-FH MU," gets
away for Paris,
and, on the left,
one of the D.H.
9's of the Belgian
Service is seen
leaving for Brus-
sels.

No less a sum than £6,053,585 is the total of the savings of soldiers to December 31, 1920, as shown by a return of Army and Royal Air Force Savings Associations just published by the National Savings Committee. British Forces contributed £4,004,265 and Overseas units £2,049,320. In the first item the R.A.F. command figures directly for £10,682, in addition to the amounts in the Associations dissolved, owing to disbandment.

results. For the opening flight the papers were sent to the Croydon aerodrome by motor-car. Although the aeroplane was a quarter of an hour late in leaving London, it arrived at Amsterdam 5 minutes before scheduled time (2 p.m.), the journey having taken 4 hours. The only stop on the journey was one of 15 minutes at Rotterdam. Upon arrival every copy had been disposed of within a few minutes of landing.



From "The Ace" (U.S.A.)

THE "KITE" 35 H.P. BIPLANE : This little American machine, designed by A. H. Fethers, Mechanical Engineer of the Union Pacific Ry. at Omaha, recently made a non-stop flight of 142 miles between Grand Island, Neb., and Omaha, in 1 hr. 25 mins. During the flight the pilot, W. G. Kite, replenished the petrol tank from two spare cans—leaving the controls to do so—and filled up with oil by sitting on a rubber hot-water-bottle containing same which was connected up to the oil tank ! The span of the "Kite" is 24 ft. ; chord and gap, 3 ft. and 3 ft. 6 ins. ; stagger, 9 ins. ; wing section U.S.A., 4 ; weight with full load for above trip, 545 lbs. ; engine, 35 h.p. Anzani ; speed range, 24-90 m.p.h.

THE AERIAL LIGHTHOUSE

BY "PHAROS"

LIGHTHOUSES and their relation to aerial navigation is a subject that calls for no small share of attention in the world of aeronautics. It is a matter of as great, if not greater, importance as wireless telegraphy. The following remarks, therefore, will, it is hoped, be of interest to readers of *FLIGHT*.

Lighthouses, or guiding lights for mariners, were in use as far back as several centuries B.C., and their history and progress thence onward makes truly fascinating study—and the writer is sorely tempted to discourse of those interesting pioneers, the Colossus of Rhodes, the Pharos of

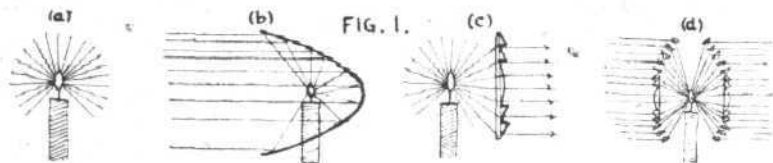


Fig. 1. Diagram illustrating methods of directing light rays. (a) Undirected light giving one candle power in all directions. (b) Light placed at focus of parabolic reflector (catoptric system). (c) Light refracted, or bent, by a glass agent (dioptric system). (d) Light refracted by centre portion, and refracted and reflected by upper and lower prisms (Holophotal system)—employed in all high-power lighthouses).

Alexandria, etc., etc. Shortage of space, however, demands that the present aspect of our subject receive first consideration.

In order more clearly to follow what is said later in regard to aerial lighthouses, it is proposed first to touch briefly on certain matters relating to marine lights. The early lighthouses were beacons, pure and simple, the source of light being obtained by burning billets of wood or coal fires in a chauffer, and reflectors, when used at all, were of the crudest. It may be of interest to note here that the illuminant used in the famous Eddystone lighthouse for nearly half a century after its erection was comprised of twenty-four ordinary candles, unaided by reflectors.

Little progress appears to have been made in the development of means for directing light by the employment of reflectors until 1763, when large parabolic moulds, fashioned of wood and lined with mirror glass, and polished tin-plate were used. Experiments were also made with lenses, placed in such a position relative to the light that as great a number of light rays emanating from the source should be directed or bent out of their normal course into the direction in which the light is required. It is not desirable to enter here into the theory of the laws governing the reflection of light, but the accompanying diagrams (Fig. 1) will enable the uninitiated to obtain some idea of the theory and the value of the employment of light-directing devices.

From the early single-piece lenses, which were very thick and absorbed a considerable proportion of the light, an important development was made—thanks mainly to Fresnel—in building the lenses in separate pieces in such a way that whilst the necessary curvatures were attained, the thickness of the glass was reduced to a minimum, and offered very little resistance to the light rays passing through it. It may be said that only minor improvements such as greater purity of glass, and increased accuracy in grinding, have been made to this (the Dioptric) system in the past seventy years.

Although the great lenses now constructed, and used in marine lighthouses for many years past, are very nearly perfect in design and construction, and leave very little to be desired from the optical efficiency point of

view, it must not be considered that finality has been reached in lighthouse practice. On the contrary, big developments in other directions—mainly mechanical features and improvement of the light source—have recently been effected, whilst the requirements of the aerial lighthouse will no doubt lead to further developments still. As marine lighthouses became more and more numerous, a means had to be devised for distinguishing one from the other. Experiment proved that this could be accomplished with Catoptric (reflected) lights in the following ways:—Fixed; revolving white; revolving red and white; revolving red with two whites; revolving white with two reds; flashing intermittent; double fixed and double revolving lights. It is of interest to note that as a result of causing the lights to be visible to an observer only intermittently, it was found that in addition to making them more easily distinguishable one from the other, they appeared to be much more easily discernible. It has been found, however, that the employment of coloured media placed between the light and the eye of the observer reduced the power of the light by as much as from 60 per cent. to 75 per cent. Only red, green and blue glass media can be used satisfactorily, and these absorb from four-sevenths to five-sixths of the whole light. The use of coloured lights as a means of identifying towns along aerial routes—a more or less popular suggestion—is thus somewhat limited.

Having given a brief outline of the development and

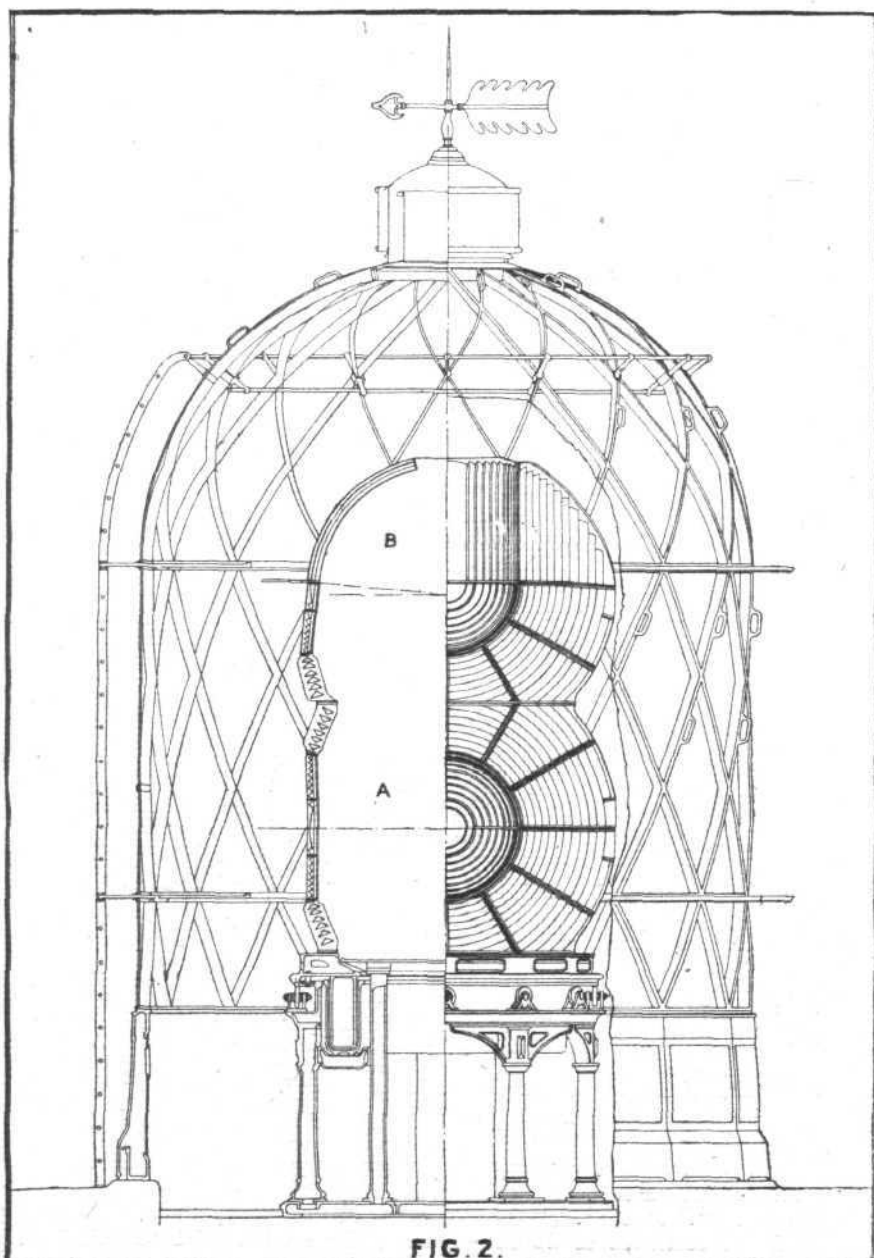


Fig. 2. The "Hood" Combined Light, in which one set of panels, A, function in the usual way for marine work, and a second set of panels, B, are employed for aerial work.

fundamental principles of the marine lighthouse, let us now consider the problem in connection with the most modern form of transport, *i.e.*, aircraft. Those responsible for this branch of aeronautics are in the fortunate position of being able to start at the point which marine authorities have reached after hundreds of years of work, involving the expenditure of millions of pounds sterling. The two problems viewed generally are really very closely allied, but it must be borne in mind that whereas in the marine lighthouse the light rays are confined to an area practically speaking at ground level, an aerial lighthouse must be capable of spreading its rays over the whole of the upper hemisphere. However, the problem does not appear to offer any insuper-

light to the horizon. The upper panels B would be superimposed upon A, and so formed as to project light from immediately above the beam emanating from A to the zenith. Actually the lens B forms a complete separate light unit, and is arranged with a second light source at its focus. The functioning of the two lenses is probably best shown in the accompanying diagram (Fig. 3), where the heavily-shaded cones represent the diverging light beams emanating from the lower panels, and the slightly shaded area is that through which the light from panels B is visible.

This diagram indicates the area through which the light is visible from two panels of the lens, and the dotted horizontal line crossing the diagram at an altitude of 6,000 ft.

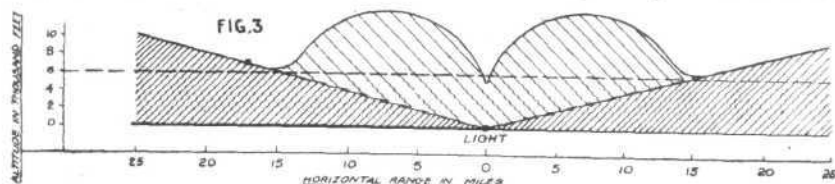


Fig. 3. Diagram indicating the area through which the light from the two sets of panels, A and B, of the Hood Combined Light, is visible

able difficulties, so long as it is realised that the greater the arc to be illuminated the greater the power of the light must be.

While it is quite possible that existing marine lighthouses will be converted so as to serve for both marine and air work, lighthouses solely for the use of aircraft are bound to come. Naturally the atmosphere at low elevations over land is much more impure than that at sea, and consequently it appears possible that lights which will be required to have a horizontal range of, say, 20 miles over land, will probably have to be of higher order than those used for similar ranges round the coast.

In connection with the problem of adapting existing marine lighthouses for aircraft, D. W. Hood, Esq., Chief Engineer of Trinity House, London, has designed an ingenious arrangement of optics whereby this object is achieved without interference to the marine duties of the light. This arrangement is shown in one of the accompanying illustrations (Fig. 2).

The lower panels A may be considered to represent a lens of an existing marine lighthouse, projecting beams of

light to the horizon. The upper panels B would be superimposed upon A, and so formed as to project light from immediately above the beam emanating from A to the zenith. Actually the lens B forms a complete separate light unit, and is arranged with a second light source at its focus. The functioning of the two lenses is probably best shown in the accompanying diagram (Fig. 3), where the heavily-shaded cones represent the diverging light beams emanating from the lower panels, and the slightly shaded area is that through which the light from panels B is visible.

This diagram indicates the area through which the light is visible from two panels of the lens, and the dotted horizontal line crossing the diagram at an altitude of 6,000 ft. It would seem that the most vital part of the problem of aerial lighthouses is not so much the character and powers of the optics of these lights, for these must obviously follow closely those necessary for marine purposes, and invaluable information upon this part of the problem should be forthcoming from the Engineer of Trinity House, but their placing and maintenance is the main point. As is well-known, it has hitherto been necessary for all lighthouses and lightships to be what is technically termed "attended." That is, their operation involves the constant attention of one or more keepers (in the case of the large lights, it is often four), whose duty it is to light, maintain and extinguish the light. Invariably the lights are placed at considerable distances from inhabited parts, and consequently such an arrangement necessitates the erection by the authorities of suitable dwellings for the attendants and their families.

Apart from the expense that such an arrangement involves, there is another factor which is deserving of consideration, namely the lonely and isolated lives of the lighthouse keepers. Reference to the risky and hazardous conditions under which the lighthouses were maintained appear frequently in history, and many are the piteous appeals for help chronicled.

These conditions were necessary when lighthouse apparatus was of such design as to compel it, but this is no longer the case, and most of the principal maritime authorities throughout the world are now converting even their largest and most important units for unattended operation.

An example of the latest type of automatic and unattended light, which embodies some most fascinating mechanical features, has been in operation at the London Terminal Aerodrome, Croydon, for the past twelve months, and although this apparatus has frequently been referred to in the Press, no descriptive technical details appear to have been published.

That mechanical finality can ever be attained is very problematical, but it is difficult to imagine that the mechanism employed in this light is likely to be surpassed for many years to come. Primarily, there is an absolutely self-contained light unit equipped for unattended operation—using dissolved acetylene as its illuminant. The light is lit and extinguished by a so-called "Sun-valve," and the Lenticular apparatus is caused to revolve by the action of the gas in passing to the burner. The incandescent mantle, which forms the light source, is automatically replaced upon its becoming defective. All these points are so ingenious as to warrant individual description. The general lay-out of this lighthouse is shown, more or less diagrammatically, in Fig. 4.

Starting at the illuminant used—*i.e.*, dissolved acetylene gas—its application, whilst not being new, has such great advantages that it should not be passed over. The production of acetylene gas by the ordinary water to carbide method has very many shortcomings, the chief among them being that the gas is so impure as frequently to choke the pipes, and burners, causing rapid depreciation of the light power, also the pressure constantly varies, and in addition there remains the fact that free acetylene gas when under pressure exceeding two atmospheres is highly explosive. Consequently its storage in large volumes is not possible under these conditions. The exploration which led to the introduction of dissolved acetylene gas was made by Messrs. Claude and Hess, two prominent French chemists, who

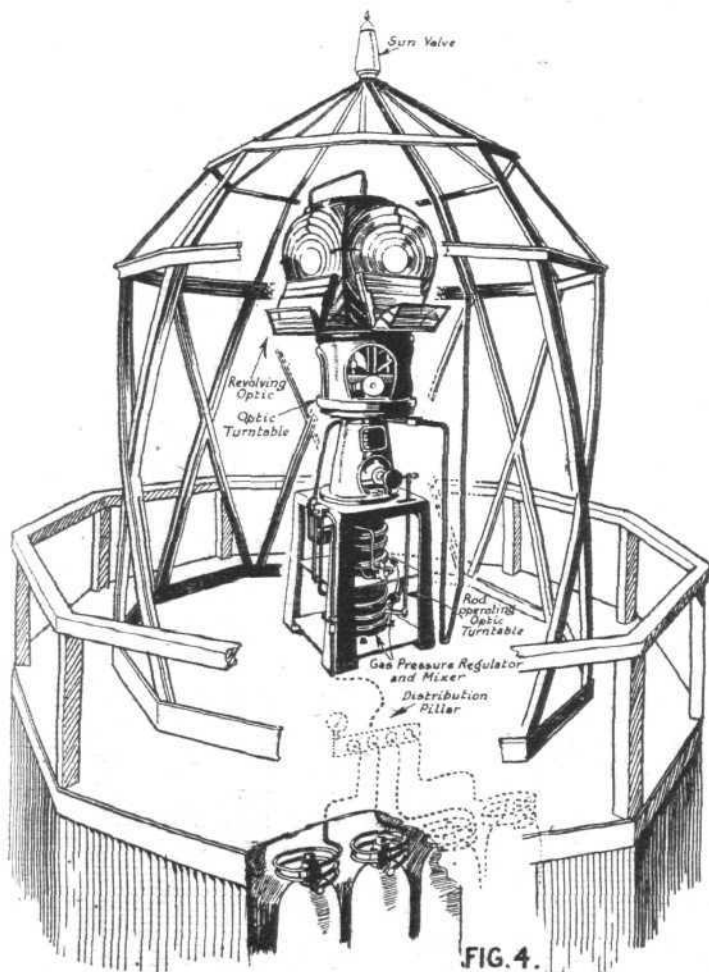


Fig. 4. This sketch shows, diagrammatically, the general arrangement of an Automatic Aerial Light-house (A.G.A.).

discovered that acetone has the power of absorbing acetylene up to twenty-five times its own volume for each atmosphere pressure at a temperature of 10 degrees C., so that, for instance, at a pressure of 10 atmospheres, it absorbs two hundred and fifty times its own volume of acetylene.

The receptacle in which the gas is stored after it has been

unattended period of twelve months or more can safely be relied upon.

Upon reference to the diagram (Fig. 6), it will be observed that the device is actuated by a spring motor, A, which requires rewinding only upon the whole magazine of mantles having been used.

The four vertical rods each carry a holder for a mantle, and are so arranged as to rest on the periphery of the revolving rack B, on which is a cam, C. It will be seen that as this rack revolves each mantle carrier in succession mounts the cam, and in doing so causes the vertical rod to move up and inwards until the mantle ring, at the top extremity of the rod, abuts against the burner stem D, thereby checking any further vertical movement of the mantle carrier. As the latter, at this point, is not quite at the top of the cam, the rack also ceases to revolve.

The mantle is then "burnt off" by the gas flame, and remains in service till it becomes defective.

Upon the mantle breaking, the gas flame impinges upon a small fusible catch, E, which when burnt through allows the mantle fitting to "slip" on the rod, with the result that the pressure upon the cam C is removed, and the carrier in service

passes over the top of the cam, and the operation is repeated by the next mantle for service.

The small pilot burner by which the main flame is ignited is not in this instance fed by a special pipe, but the main burner is utilised for this purpose, in such a way as to ensure operation.

For purposes of automatically extinguishing the light at sunrise, and lighting it at the approach of darkness, the sun-valve is used. This valve, shown in Fig. 7, is actuated entirely

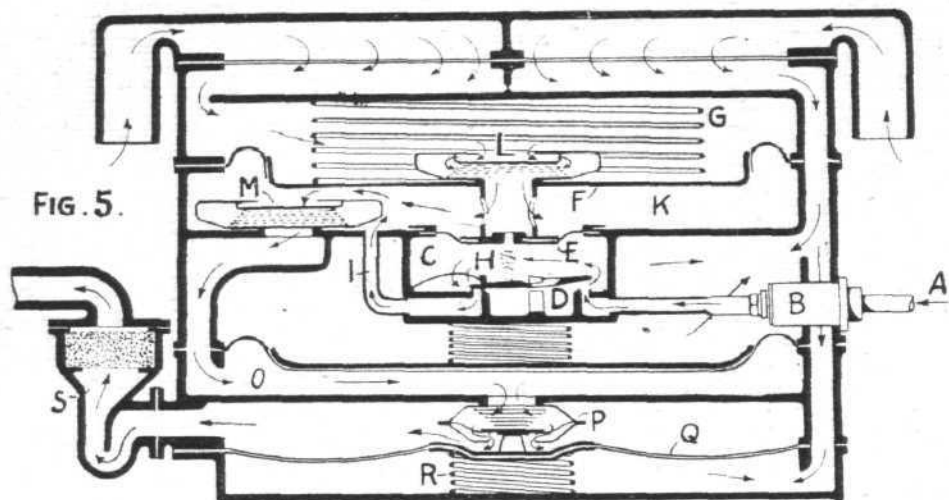


Fig. 5. Diagram of the "mixer" of the automatic aerial lighthouse.

purified and dried, is generally known as a "gas accumulator," and is similar to the familiar oxygen cylinders.

The cylinder is of drawn steel and filled with a porous substance (80 per cent. porosity). This is saturated with acetone before the cylinder is charged with acetylene. Gas stored in this way is classed by the Board of Trade as non-explosive. Accumulators (the number and capacity of which naturally vary according to the period over which unattended operation is required) are connected by pipes of special construction to a distributing pillar, at which point a pressure indicator and main gas cock are placed. From here a main supply pipe is run directly to the pressure regulator in the lantern house, the object of which is to reduce the high pressure of the gas from the cylinders to the lower constant pressure required for the operation of the light. From the regulator, gas is led to the mixer (Fig. 5), where it is admitted at A, passes through a filter, B, and enters the gas-chamber C, through the inlet valve D. Here the pressure of the gas forces the diaphragm E of the gas-chamber upward, and with it the pump diaphragm F, compressing the spring G, and admitting air into the pump-chamber K, through the air valve L. When the diaphragm has reached the end of its up-stroke, the mechanism contained in the gas-chamber C closes the inlet valve D, and opens the outlet valve H, allowing the gas to escape through the pipe I, into the pump-chamber K. With the pressure against the diaphragm F thereby relieved, the spring G effects the downward stroke and forces the mixture of air and gas through the discharge valve M into the equaliser O. The object of the equaliser is to maintain the supply of gas during the upstroke of the pump diaphragm. From the equaliser O the gas flows through a regulating valve, P, into the regulator, where the diaphragm Q and spring R maintain a constant pressure. From the regulator the gas is finally led through the fuse valve S direct to the burner.

The incandescent acetylene burner employed in this installation is of the inverted type, i.e., the flame is directed downward, whereby a better luminous efficiency is obtained than with the upright type. Another advantage of the inverted burner is that the mantle can be more firmly secured, which is of great importance with regard to durability. These mantles are made of special silk, and are of a tough and elastic nature, but under the best conditions the life of an incandescent mantle can never be exactly predicted, and to avoid total extinction of the light from this cause, an automatic mantle replacement device is fitted. This particular unit is equipped with four mantles, three being held in reserve, but it is understood that a battery of as many as twelve mantles can be supplied. The average life of a mantle is stated to be from two to three months, and therefore an

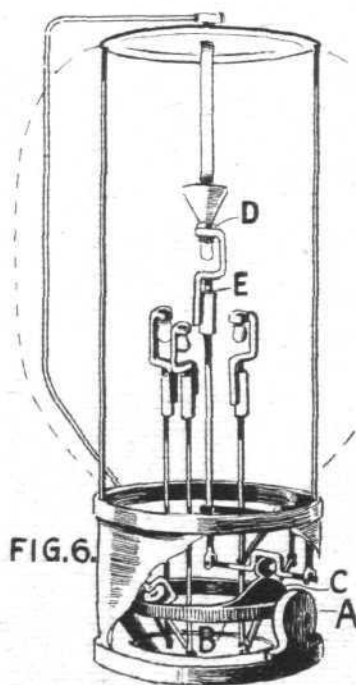
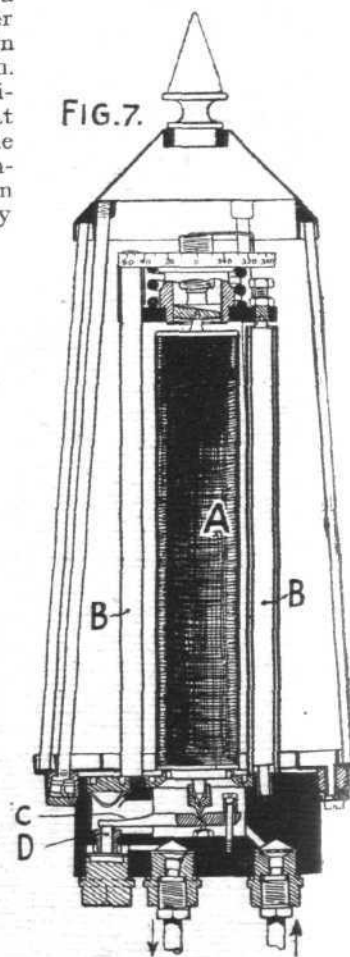


Fig. 6. Sketch of the mantle-changing device of the automatic aerial lighthouse.

Fig. 7. The "Sun-Valve" of the automatic aerial lighthouse, which lights the burner when darkness approaches, and turns it out as soon as daylight comes.



by light, and is not influenced by changes of temperature. Its construction is based on the well-known physical law that absorbed light is transformed into heat. It consists of a system of metal rods protected by a strong glass cylinder.

The central rod A is coated with lamp-black, which gives it the property of absorbing light, while the three rods B surrounding it are polished, and thus reflect the light. All

four rods expand or contract in the same degree under the influence of heat or cold, but only the central rod expands under the influence of light. The additional expansion so caused is used to operate a valve, C and D, which controls the passage of gas in a branch pipe between the mixer and a valve inserted in the main pipe to the burner, and controlling in its turn the gas supply to the latter. With increasing daylight the black rod expands and closes the valve; at the approach of darkness it contracts and opens the valve.

The optic is carried on a turntable (see Fig. 4), which is suitably mounted on a bearing, and it is caused to rotate by the movement of the diaphragms in the mixer, this movement being transmitted to the turntable by a shaft and the necessary gearing. By the employment of the natural rise and fall of the mixer diaphragms (caused by the pressure of the gas passing to the burner) for this purpose, no special supply of power is required for the operation. During the daylight hours the supply of gas is cut off by the Sun-valve, and the lens ceases to rotate till the approach of darkness.

The gas, it should be mentioned, after leaving the Sun-valve passes through a mercury seal carried on the turntable, as the piping on the latter revolves with it—all other piping being fixed.

The fourth order, four panel optic employed is composed of dioptric (refracting) and catadioptric (reflecting and refracting) elements, which serve to concentrate and project the light rays falling upon them into four diverging beams

of great power, directed slightly above the horizontal. Light is delivered to the upper hemisphere by the employment of suitably disposed refracting and reflecting elements which intercept part of the light emanating from the lens panels, and project it into the arc, extending from immediately above the main beam to the zenith.

Time and experience alone can determine the most efficient distribution of light for aeronautical navigation. Pilots consulted upon this subject offer views so widely different that little help can be derived from that source. Some state that lights of many thousands of candle power, visible through 180 degrees, should be placed at intervals of ten miles along the routes. Others that vertical searchlight beams at intervals of a few miles are better than lighthouses, and again one meets the pilot who is perfectly happy with the present arrangements.

Probably the path to be followed is between these extremes. To establish costly lights only a few miles apart is ridiculous, and is nothing more or less than offering a pilot a well-lit street to fly down; the fact is that he must learn to navigate. On the other hand, the provisions now in existence for night flying are undoubtedly inadequate.

However, it is understood that the authorities are thoroughly investigating the whole subject before committing themselves to the expenditure of large sums of money. It is perfectly easy to lay out twenty thousand pounds on only one beacon light, but it is highly desirable that all possible precautions should be taken to ascertain that such an expenditure produces the required results.



Paris Aero Salon in November

EITHER the first or last fortnight in November next will be the period for holding the Paris Aero Salon. The exact date rests with a Chambre Syndicate Committee appointed for the purpose, and meeting early in May. That month it is claimed will be preferable to December as it renders more easy the combination of the Grand Palais exhibits with aerodrome demonstrations. It is hoped next year to go one better in this respect, by holding the 1922 salon earlier, with even July as a possible date.

A Helicopter Prize

M. SOREAU, President of the Ae.C. of France, last week announced the offer by the Club of a prize of 25,000 francs for the first helicopter which shall rise 25 metres vertically through an imaginary cylinder, descending again to the starting spot. At the moment the offer may seem somewhat empty, but if we accept the views of some of those who are engaged upon this special problem, it should not be overlong before the Club is called upon to pay over the 25,000 francs. We sincerely trust the Club may have that pleasure and great honour.

Italy Increases its Aviation Vote

THE Italian Minister of War has been successful in obtaining a substantial increase to the 17 million lire already voted for aeronautical purposes, amounting to about

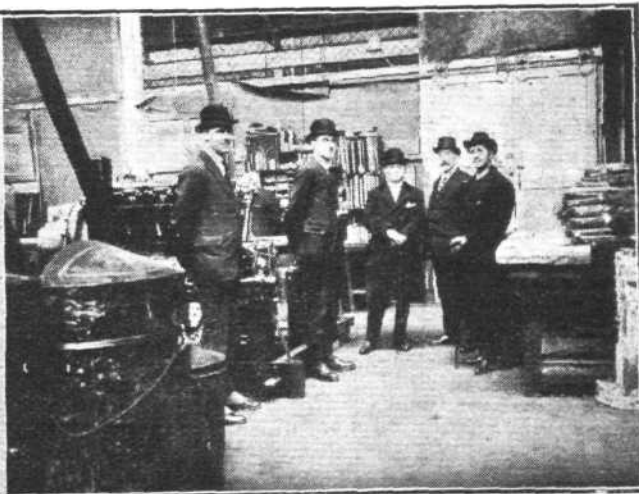
30 million lire. The firms still engaged in the production of aircraft are to receive 1 million lire each for delivery of machines and as a subsidy towards research and experiments. These firms are: Ansaldo, Fiat, Savoia, Macchi and Breda.

French Machine Catches Fire

ALTHOUGH it is now a very rare occurrence for an aeroplane to catch fire while flying, isolated cases of this happening are still to be found. Careful engine installation and sound petrol systems reduce the chance to a practical impossibility. Last week a case of fire on board occurred in France. The aviator Pillon and his mechanic were flying over Villacoublay aerodrome at a height of about 8,000 ft., when their machine caught fire. By side-slipping down as rapidly as possible, Pillon was able to alight safely, although both he and his mechanic were badly injured by burns. They are, however, now considered to be out of danger.

Poland "Arrests" a Zeppelin.

ACCORDING to advice from Warsaw, last week a German Zeppelin for two hours cruised over the Polish town of Czenstochowa, terrifying the inhabitants, but finally was forced by a mishap to land in the neighbourhood. The crew, numbering three officers and ten soldiers, were arrested by the crowd which assembled round the Zeppelin, and handed over to the authorities, who are making an enquiry. Cameras and Staff maps were found on the crew.



H.S.R. Major Prince Pridi of Siam, cousin of the present King of Siam, who is at present in England gathering information to assist Siam in the formation of an Air Force, at the Napier Acton factory, where he is seen in the right-hand photograph after inspecting the 1,000 h.p. "Cub" (on the left). The Prince, who arrived at the works in a 6-cyl. Napier (left photo.), is on the extreme right of the picture, Mr. H. T. Vane, C.B.E., Managing Director of D. Napier and Son, Ltd., being between him and Phra Sanpakitch, First Secretary to the Siamese Legation.

SIDE-WINDS

USEFUL as well as ornamental is a stamped brass ash-tray, which is to hand from friend Cecil Broadhurst, who sees that the Vandervell light is not hidden under a bushel. Produced in good taste, the little souvenir is practically devoid of advertising matter, the four little *boutons*, with the "C.A.V." monogram, being so artistically designed, that they might be R.A.F. buttons.

MESSRS. S. E. SAUNDERS AND CO., the world-wide known boat and aircraft builders of Cowes, whose "Consuta" wood method of hull and body construction is proving such a remarkable success, have not remained closed long. The firm, which is under the direction of Mr. Samuel Saunders, had to close their works owing to labour troubles, and has now re-opened and looks like running along smoothly, as they have determined to carry on as a non-union firm. We learn that the response of the men exceeded expectations. The foremen had previously decided to remain loyal to the firm, and nearly 50 per cent. of employees returned. Others who are hesitating because of trade union allegiance, are being allowed time to decide, after which their places will be filled. Applications from men of skilled trades have been received from all parts, and, with so much unemployment, no difficulty in obtaining the men required is anticipated. The rates of pay remain unaltered, and a profit-sharing scheme is proposed by Mr. Samuel Saunders, who is regarded as a model employer.

"CASTROL" in England requires no explanation. Judging by a letter recently received by Messrs. C. C. Wakefield and Co. from Maj. S. G. Kingsley, Director of The River Plate Aviation Co., Buenos Aires, this great lubricant is as popular the world over as at home. Maj. Kingsley writes:—"It may be of interest to you or your principals to know that this Company has two large passenger-carrying machines, fitted with Rolls-Royce engines, in which Wakefield 'Castrol' is exclusively used.

"In addition to this, in my own Rolls-Royce-Airco 4A, which has now covered 40,000 miles in the Republics of Argentine, Uruguay and Brazil, I invariably use your Castrol 'R.' The 40,000 odd miles mentioned include all the long distance journeys such as the Buenos Aires-Tucuman, Buenos Aires-Mendoza-San Juan-Cordoba-Buenos Aires, Buenos Aires-Montevideo-Rio Grande-Porto Alegre-Sant' Anna-Buenos Aires, and many other long flights of between 1,000 and 2,000 miles.

"The oil has given complete satisfaction, and is a fitting lubricant for such an excellent power unit as a Rolls-Royce engine."

WE referred in our issue of March 31 last to an oil prospecting expedition per Supermarine, and we have now received a few further particulars in reference to the "L.B." type camera which is being used in this venture. This camera is made by the Williamson Kinematograph Co., Ltd.—the originators of the design—and has been adopted as the standard aero-camera by the R.A.F. It was employed almost exclusively by the latter during the War, and proved its efficiency and value over and over again. We are glad to hear that Messrs. Short Bros., of Whitehall House, Charing Cross, S.W. 1, have just concluded arrangements whereby they have been appointed sole concessionaires outside the British Empire for this camera.

Air-Mail Services

THE Postmaster-General announces that as from last Monday, in addition to the existing air mail services from London to Paris and to Brussels, there will be:—

1. A morning air mail from London to Amsterdam, leaving Croydon aerodrome at 10 a.m., serving all parts of Holland, and, by means of the afternoon train from Amsterdam, North and Central Germany, Denmark, Sweden and Finland.

2. A combined service by ordinary night mail from London to Rotterdam, connecting on the following morning with an air mail from Rotterdam to Bremen, Hamburg, and Berlin, which will serve North and Central Germany, Denmark, and some countries east of the Baltic.

The special fee payable, in addition to ordinary foreign postage, on packets posted for transmission by either service will be 4½d. per oz.

Particulars of the new and of existing air mail services are given in a new air mail leaflet, which can be obtained free of charge at any head or branch post office. The opening of the air route Hamburg-Copenhagen, mentioned in the leaflet, has been postponed at the last moment; but air mail letters for Denmark can still obtain an advantage of three to twenty-

four hours over the ordinary service, whether sent by the morning air mail to Amsterdam or by the combined service via Rotterdam. The latter service will, for the time being, offer no advantage for letters to Sweden and Finland. Attention is drawn to the fact that, on and from the 18th inst., the special fee payable, in addition to ordinary foreign postage, on packets posted for transmission by the London-Brussels air mail will be 4d. per oz., instead of 2d. per oz. as hitherto.

PUBLICATIONS RECEIVED

Verficherung und Luftverkehr. By Dr. Hermann Doring. Verlag von E. C. Mittler and Son, Rochstrasse 68-71, Berlin.
Heat Treatment Bulletin No. 27. The Effect of Overheating High Carbon Steel. By L. W. Wild, M.I.E.E. Automatic and Electric Furnaces, Ltd., 281-283, Gray's Inn Road, London, W.C. 1.

Observations on the Flight of Flying Fishes. By E. H. Hankin, M.A., Sc.D. From the *Proceedings of the Zoological Society of London*, 1920.

The Year Book of Wireless Telegraphy and Telephony, 1921. London: The Wireless Press, Ltd., 12-13, Henrietta Street, Covent Garden, W.C.2. Price £1 1s. net.

Railways and Air-Raids. Part V, British Railways and the Great War. By Edwin A Pratt. London: Selwyn and Blount, Ltd., 21, York Buildings, Adelphi, W.C. 2. Price 3s. 6d. net.

Report on the Commercial Situation in Siam.—By T. H. Lyle, C.M.G. London: H.M. Stationery Office, Imperial House, Kingsway, W.C. Price 1s. 3d. net.

Mathematical Monographs. Edited by M. Merriman and R. S. Woodward. No. 21. *The Dynamics of the Airplane.* By Kenneth P. Williams, Ph.D. New York: John Wiley and Sons, Inc. London: Chapman and Hall, Ltd. Price 13s. 6d. net.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: cyl. = cylinder; I.C. = internal combustion; m. = motors. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1919

Published April 21, 1921

- 20,399. H. J. ROUND. Wireless direction finders. (160,475).
31,746. W. S. and G. L. SMITH. Gyrostatic controls for aeroplanes. (160,523.)

APPLIED FOR IN 1920

Published April 21, 1921

576. J. E. THOMPSON. Aeroplane propellers. (160,598.)
8,209. BALLONHULLEN-GES. Parachutes. (140,460.)
9,776. M. KAPPERER. Wheels. (141,356.)
11,968. F. FOY. Radiator supports. (160,681.)
12,566. CARREY ROTARY ENGINE CO. Rotary engines. (160,684.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xiii and xiv).

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